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SURVEY OF SHRIMP FISHERIES OF CENTRAL AND SOUTH AMERICA

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United States Department of the Interior, Fred A. Seaton, Secretary
Fish and Wildlife Service

SURVEY OF SHRIMP FISHERIES OF CENTRAL AND SOUTH AMERICA

by

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ABSTRACT

This report is primarily an examination of the potentialities of the shrimp fisheries of Latin America as a source of supply for the United States market.

A survey conducted by the author indicates that there are vast stretches of coast along continental Latin America where the shrimp populations are very sparse or are concentrated in patches in widely scattered areas. For some countries the production outlook is favorable and the prospect for the development of the fishery is discussed in relation to the availability of commercial species on the fishing grounds, processing and marketing costs, and the effect of government regulations and controls. In the case of Mexico, the chief source of shrimp imports into the United States, the fishery appears to have reached the stage where productive ability no longer depends upon fishing or plant capacity but more upon the biological potential of the species of shrimp and the capacity of the market to absorb smaller-sized shrimp.

There are at least 21 species of marine and brackish-water shrimp that are of commercial importance in continental Latin America. However, 10 species of shrimp belonging to the genus Penaeus comprise the bulk of the shrimp fishery, accounting for about 90 percent of the total catch.

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INTRODUCTION

In recent years increasing interest in the shrimp fisheries of Latin America has led to many inquiries as to just what these fisheries are and what may be expected to develop from them. Only scattered information of dubious reliability has been available. This report has been prepared after on-the-spot surveys--more extensive for some countries than for others--to supply the answers to many of the questions that the United States Fish and Wildlife Service has been asked. The surveys were made for the most part during the period October 1955 to April 1956.

For each country, detailed data are given on commercial species and fishing grounds, on outlook for production, on fishermen and gear, on processing and marketing, on foreign trade, and on governmental assistance. The same sequence of presentation is followed, as far as possible, for each country.

The 1955 total annual production of shrimp throughout continental Latin America was estimated to be between 120 million and 125 million pounds, heads-on weight, or 71.4 to 74.4 million pounds, heads-off weight (table 1). It is estimated that the shrimp fisheries of this area, when fully developed, may produce from 200 million to more than 300 million pounds, heads-on weight, each year.

In many instances the catch, for economic and other reasons, may never approach its potential. Moreover, in numerous places shrimp species of small size form a great part of the potential supply. These small shrimp now have a limited market and unless marketing conditions change appreciably it is not likely that the catch will reach the potential soon.

There are very few, if any, shallow-water coastal areas in Latin America that have not been explored to some extent. Those areas that were found relatively easy to exploit have been exploited or are in the process of being developed. Scarcity of shrimp, lack of facilities, currency control, and legal restrictions are some of the reasons why the development of the other areas has been prevented or delayed. The would-be explorer or prospective investor should bear these facts in mind.

There are at least 21 species of marine and brackish-water shrimp that are of commercial importance in continental Latin America. A number of other species are caught in the fishing operations, but either they are discarded by the fishermen or the amounts landed are so small that they have not been considered of commercial importance up to the present time.

Ten species of shrimp belonging to the genus Penaeus comprise the bulk of the shrimp fishery, accounting for about 90 percent of the

total catch. The shrimp of this genus are tropical, or subtropical, coastal or shallow-water forms. Most, but probably not all, require brackish water during the juvenile phase of their life cycle. Spawning occurs at sea and the recently hatched shrimp move to coastal or inland brackish waters. Growth is rapid, and as the shrimp approach maturity they return to the sea. Life is short, in most species not exceed 2 or 3 years. Some species do not live much beyond the first year owing principally to intensive fishing.

In continental Latin America, commercial fisheries for members of the genus Penaeus extend along the eastern coast from the Gulf of Mexico to southern Brazil and on the Pacific from Baja California to northern Peru. The southern limit seems to be along the coasts of Uruguay and Peru. The distribution of the species is by no means uniform throughout this range. There are vast stretches of coast along which the shrimp populations are very sparse or are concentrated in patches in widely scattered areas. This is particularly true of the east coast; of which all of the continental shores bathed by the Caribbean Sea and the area off the coast of Brazil, from about the eastern boundary of the State of Maranhao to at least Salvador, are examples.

In certain areas, Penaeus does not seem to be able to compete with other, smaller shrimp. The sea bob, Xiphopeneus kroyeri, apparently almost completely dominates the coastal nursery grounds from near the mouth of the Amazon to about the eastern border of British Guiana. In British Guiana (and probably extending north throughout the delta of the Orinoco 1/) still smaller shrimp, Palaemon schmitti and Hippolysmata oplothoroides, seem to have displaced the sea bob.

1/ Reports of exploratory fishing in the Gulf of Paria and off the Orinoco Delta have not indicated any large concentrations, as normally would be expected, of either Penaeus or Xiphopeneus.

TABLE 1.--ESTIMATED 1955 LANDINGS AND POTENTIAL LANDINGS OF SHRIMP IN CONTINENTAL LATIN AMERICA

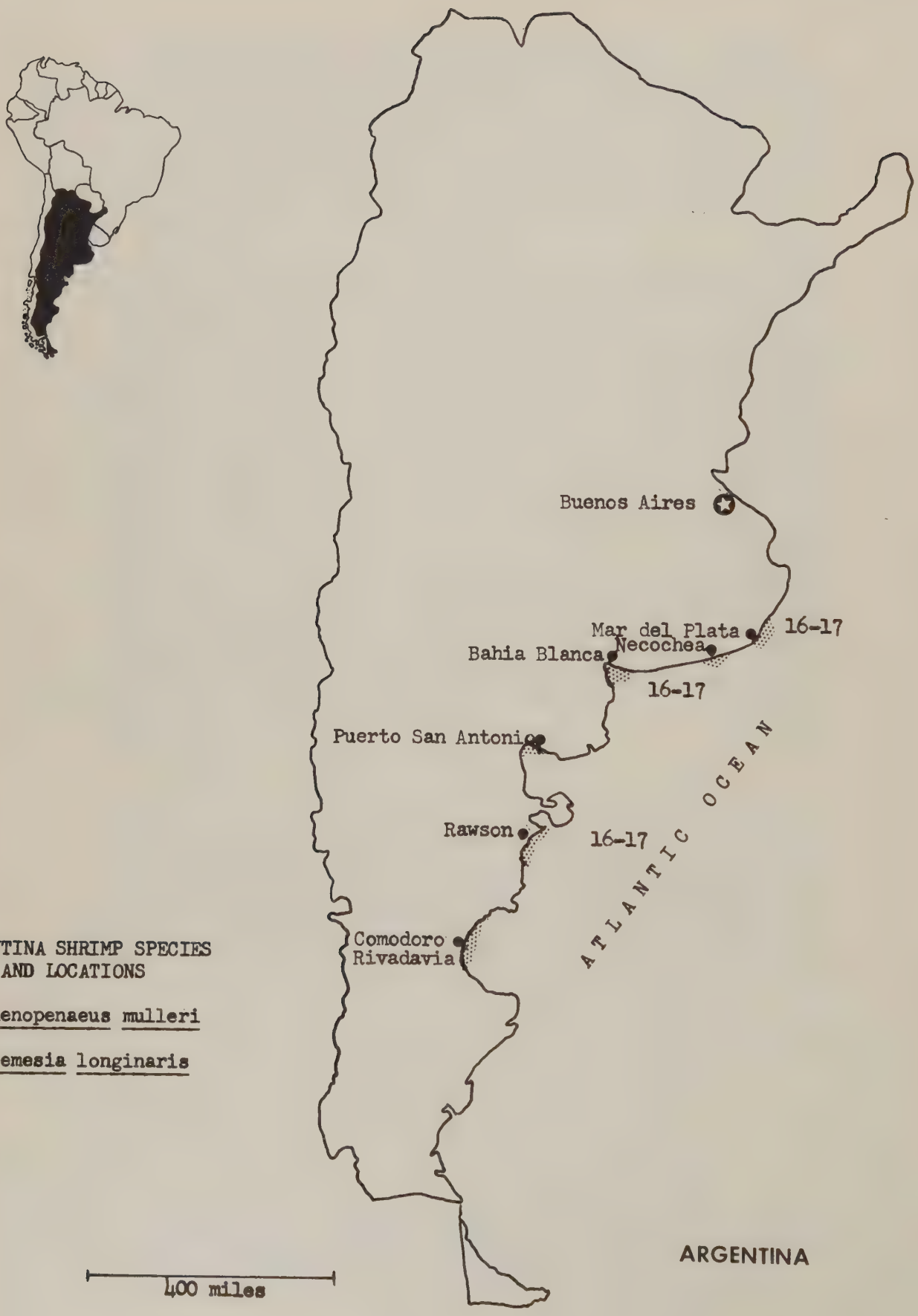
(Heads-on weight, in thousands of pounds)

Country	1955 production (estimated)	Potential 1/
Argentina	3,500	10,000
Brazil	22,500	60,000 to 100,000
British Guiana	800	4,000 to 5,000
British Honduras	(2)	200
Chile	200	2,000
Colombia	1,600	10,000 to 20,000
Costa Rica	500	2,000 to 3,000
Ecuador	2,200	10,000 to 20,000
El Salvador	300	1,000 to 3,000
French Guiana	(2)	5,000 to 6,000
Guatemala	50	1,000 to 2,000
Honduras	50	500
Mexico	80,000	80,000 to 100,000
Nicaragua	100	2,000 to 3,000
Panama	7,200	15,000 to 30,000
Peru	800	1,000 to 1,500
Surinam	1,000	5,000 to 6,000
Uruguay	(3)	(3)
Venezuela	2,000	8,000 to 10,000

1/ The estimates of potential production attempt to evaluate the maximum supply of all shrimp whether of large or small size. These estimates represent only "educated guesses" and should be considered as such. Reliability of the estimates varies since better information is available for some countries than for others. The reader should refer to the material presented for each country to appraise the reliability of these estimates.

2/ Estimate not available.

3/ Believed to be insignificant.



ARGENTINA SHRIMP SPECIES
AND LOCATIONS

16 Hymenopenaeus mulleri

17 Artemesia longinaris

ARGENTINA [2/]

Two species of shrimp, both pink in color, are taken commercially along Argentina's coast. The best fishing grounds are in Patagonia near the town of Rawson. Over 7 million pounds, heads-on weight, were caught during 1953, the peak year. The catch has dropped to about one-half since then owing to a scarcity of shrimp. When shrimp are abundant probably more than 10 million pounds could be taken annually. Canning and freezing plants are located in Rawson and Mar del Plata. Shrimp are on the export-control list to which the official rate of exchange applies.

COMMERCIAL SPECIES AND FISHING GROUNDS

Two species of shrimp are caught commercially in Argentina. One, Artemesia longinaris, is quite small, rarely exceeding a size greater than 50 to the pound, heads-off. This species is called "camaron". The second species, Hymenopenaeus mulleri, called "langostino" (the young of this species are also called "camaron",) grows to a considerably larger size; some will reach 10 to 15 to the pound, headless, but most average between 21 and 35 to the pound. The langostino belongs to the same genus as the red shrimp found in deep water in the Gulf of Mexico. Both the langostino and the camaron are pink in color. The ripe ovaries, two lobes of which extend the length of the female abdomen (tail), of the langostino are bright green in the fresh or frozen shrimp. The United States market is not accustomed to shrimp with ovaries of this color.

The fishing grounds are scattered along the coast from near Mar del Plata to Comodoro Rivadavia. The northern area from Mar del Plata to Bahia Blanca is most productive in small shrimp, and the Patagonian coast, particularly near Rawson, usually produces most of the large shrimp. Isla Escondida, a small island near Rawson, is a famous fishing ground for the larger shrimp.

2/ The survey of Argentina was made during May 1956 and this time is implied in references to current events or prices.

TABLE 2.--SHRIMP LANDINGS IN ARGENTINA, BY ZONES, 1954

(Converted to pounds, heads-on weight)

Zone	Small	Large	Total
Mar del Plata	385,400	207,900	593,300
Quequen - Necochea	(1)	20,000	20,000
Bahia Blanca	225,100	505,300	730,400
Rawson	37,700	1,832,900	1,870,600
C. Rivadavia	-	700	700
High-seas boats	-	10,100	10,100
Total	648,200	2,576,900	3,225,100

1/ Less than 100 pounds.

The shrimp are caught in shallow water, usually less than 10 fathoms. Fishermen claimed that the largest langostinos were in the deeper waters near Rawson, but they were unable to fish in depths greater than 10 fathoms owing to the rocky nature of the bottom.

The availability of the shrimp fluctuates widely (table 3); 1952 and 1953 were particularly good years for the large shrimp in the Rawson area. In both years, when shrimp were particularly abundant, the boats were placed on daily maximum limits of 4,000 kilograms (about 8,800 pounds) each. Since then the shrimp have not appeared in such abundance. The 1953 shrimp catch was over 7.1 million pounds, heads-on weight. The catch of large shrimp was over 5.8 million pounds in 1952 but dropped to less than 2.2 million pounds in 1955. In 1954 the total yield of the marine fisheries was 154.8 million pounds. Hake, with 64 million pounds, ranked first, and shrimp, with 3.2 million pounds, was seventh.

TABLE 3.--SHRIMP LANDINGS IN ARGENTINA, BY YEARS, 1946-1955

(Converted to pounds, heads-on weight)

Year	Small	Large	Total
1946	766,700	670,800	1,437,500
1947	1,081,600	559,100	1,640,700
1948	1,071,400	752,600	1,824,000
1949	659,400	2,146,000	2,805,400
1950	976,400	2,099,700	3,076,100
1951	1,251,800	4,309,800	5,561,600
1952	790,800	5,834,300	6,625,100
1953	1,444,700	5,699,600	7,144,300
1954	648,200	2,576,900	3,225,100
1955	1,238,500	2,144,200	3,382,700

Although shrimp are taken throughout the year, the best season for the large shrimp is during the summer, between October and February (table 4). Examination of frozen specimens of H. mulleri taken during this time of year indicated that these shrimp were spawning then. The smaller species does not seem to be as seasonal in its availability.

TABLE 4.--LANDINGS OF LARGE SHRIMP IN ARGENTINA,

BY MONTHS, 1952 AND 1953

(Converted to pounds, heads-on weight)

Month	1952	1953
January	1,179,200	278,200
February	540,800	285,500
March	15,000	72,500
April	23,800	95,900
May	58,000	187,900
June	37,900	419,300
July	149,500	43,700
August	124,100	287,900
September	47,600	368,800
October	565,700	576,500
November	1,695,400	1,329,800
December	1,397,300	1,753,600
Total	5,834,300	5,699,600

OUTLOOK FOR PRODUCTION -

So little is known about the Argentinian shrimp that it is impossible to estimate with any degree of accuracy what future production might be. Indications are that the supply is limited and subject to fluctuations. In years of abundance the catch probably could exceed 10 million pounds, heads-on weight. The local market now consumes almost the entire production.

FISHERMEN AND GEAR

A few small boats operating with beam trawls out of Mar del Plata are the only boats that fish for shrimp throughout the year. When shrimp are abundant or market demand good, from 18 to 20 medium-sized (about 60 feet long) otter trawlers go for shrimp. At other times these boats will trawl for fish. The trawlers had originally been constructed for the shark fishery.

Six to eight men comprise the crew of a trawler. They are paid on a share basis after deducting operating expenses such as fuel, food, and ice. The owner takes two or three shares for the boat, and each member of the crew receives one share.

Trips are made daily, the boats leaving and returning with the tide. The trawl is the European type with long wings and 10- to 30-fathom legs between the doors and the wings. The shrimp for local consumption are not iced aboard.

Figure 1.--Otter board used by Argentinian shrimp fishermen. Mar del Plata, Argentina.

PROCESSING AND MARKETING

When the shrimp boats return to port, the shrimp are cooked and packed in wooden boxes containing 8 kilograms (about 17 pounds) of whole shrimp. When the shrimp are intended for export they are iced aboard the vessel in metal drums. Some are frozen in Rawson; others are trucked to Mar del Plata, where they are packed in 5-pound cartons and frozen.

Shrimp are also canned in Argentina. The wet pack is customary. A large portion of the shrimp production is frozen. The freezing and canning plants are located in Rawson and Mar del Plata. In 1953 about 908,000 pounds of raw large shrimp and about 33,000 pounds of small shrimp were processed in these plants. In 1952 about 3.2 million pounds of large and about 132,000 pounds of small shrimp were handled in the processing plants.

In Buenos Aires shrimp are retailed cooked-whole. Small shrimp were selling for about 4 pesos (about 10 United States cents 3/) a pound and large shrimp for about 9 pesos a pound. Beef was retailing for 2 or 3 pesos a pound.

FOREIGN TRADE

Argentina imports only small quantities of fishery products. In 1954 the total was but 154,000 pounds, of which 128,000 pounds were canned fish from Peru and 22,000 pounds were live Chilean lobsters. The remaining 4,000 pounds were fresh and canned fishery products from Chile. The Central Bank establishes a list of import items which can be imported on free exchange and without need for prior exchange permits. Since shrimp are not on this list, an import permit is required. Permits for foodstuffs are granted only for essential items, of which shrimp is not considered to be one.

The principal exports of fishery products are fish meal and fresh and frozen fish and shellfish. In 1953, total exports of fishery products (table 5) were valued at $59,000. The exports of fresh and frozen shellfish were probably entirely frozen shrimp, most of which were destined for the United States (table 6).

3/ The rate of exchange on the free market was 40 Argentine pesos = $1.00 or 1.00 peso = 2-1/2 U. S. cents. This rate is used for all conversions to U. S. dollars for the Argentine peso.

TABLE 5.--EXPORTS OF FISHERY PRODUCTS FROM ARGENTINA, 1953

(Quantities converted to pounds; values converted to United States dollars)

Type of product	Quantity	Value
Fresh and frozen fish	495,600	7,825
Fresh and frozen shellfish	379,200	31,270
Dried fish	(1)	(1)
Canned fish, in oil	10,400	1,615
Canned fish and shellfish not in oil	64,400	4,805
Fish oil	2,200	(1)
Fish meal	1,652,300	13,503
Total	2,604,100	59,063

1/ Less than 100 pounds or 100 dollars.

TABLE 6.--EXPORTS OF FRESH AND FROZEN SHELLFISH FROM ARGENTINA, BY COUNTRY OF DESTINATION, 1951 TO 1954 1/

(Converted to pounds)

Country of destination	1951	1952	1953	1954
United States	2,600	28,400	349,400	375,700
Panama	(2)	-	200	-
Uruguay	6,000	21,800	28,700	4,200
Others	400	200	900	-
Total	9,000	50,400	379,200	379,900

1/ Believed to be almost entirely frozen shrimp.
2/ Less than 100 pounds.

The Central Bank establishes a list of export items that are subject to the official rate of exchange of 18 pesos to 1 United States dollar. Items not on this list are subject to the free-market exchange of 40 pesos to the dollar. Shrimp are subject to the official rate of exchange, but it was reported that an attempt was being made to remove shrimp from the controlled-currency list.

A tax is levied upon certain export items up to 25 percent by the Central Bank. Inasmuch as shrimp had not been exported since this duty went into effect, it was not known what, if any, tax applies.

BRAZIL 4/

Brazil is estimated to produce between 20 and 25 million pounds, heads-on weight, of shrimp a year. Eventual production may reach 60 to 100 million pounds, heads-on weight. About half the production comes from near the mouth of the Amazon River. Most of the catch is small-sized shrimp taken on or near the nursery grounds. Practically the entire catch is consumed within the country. More than half the catch is sold partially dried and heavily salted. There is only one plant freezing shrimp in northern Brazil. The remaining processing plants are near the Uruguayan border at Rio Grande. Brazil has import, export, and exchange controls.

COMMERCIAL SPECIES AND FISHING GROUNDS

Five species of shrimp are taken commercially along the coast of Brazil. In the North, in the states of Para and Maranhao, the sea bob, Xiphopeneus kroyeri, is the most abundant species. In this area it is called "piticaia" but in Rio de Janeiro and Santos it is known as "camarao de sete barbas". Penaeus aztecus and P. schmitti are also taken in the north, where both are called white shrimp, "camarao branco." In Rio de Janeiro P. aztecus and small P. brasiliensis are usually called dark shrimp "camarao lixo," and P. schmitti is known as true or white shrimp, "camarao verdadeiro" or "camarao branco." P. duorarum and apparently some of the larger P. brasiliensis in Rio de Janeiro and Santos are called pink shrimp, "camarao rosa." In the far south, at Rio Grande, only one species, P. brasiliensis, is of commercial importance.

Large and jumbo shrimp are usually taken only by trawlers operating out of the ports of Rio de Janeiro and Santos. Most of the Brazilian shrimp catch is of small-sized shrimp. This is because about one-third of the catch is sea bobs, a species that does not attain large size, and much of the remainder consists of the young of the other species taken on or while leaving the estuarine nursery grounds.

4/ The survey of Brazil was made during April, 1956, and this date, unless otherwise specified, is implied when current events or prices are alluded to.

Baia de Marajo
2-9-11
Belem
Sao Luis
Parnaiba
ATLANTIC
OCEAN
Salvador
2-9
Ilheus
3-11
Rio Doce
Rio de Janeiro
2-9-10
Cabo Frio
Santos
2-9-10
3
2-9-10-11
Cananeia
9-10-11
9-10-11
I. de S. Francisco
Laguna
9-10
Porto Alegre
10 Lagoa dos Quadros
Lagoa dos Patos
10 Rio Grande
BRAZIL
BRAZIL SHRIMP SPECIES
AND LOCATIONS
2 Penaeus aztecus
3 P. duorarum
9 P. schmitti
10 P. brasiliensis
11 Xiphopenaeus kroyeri
600 miles

Figure 2.--Trawlers unloading in Santos, Brazil.

The northern fishing grounds, between the eastern shore of the Baia de Marajo and Sao Luiz, and the area around Parnaiba probably produce about half of the Brazilian shrimp catch. Fishing, with trap nets and seines, is performed in the estuaries and along the beaches. About 60 percent of the catch in this area appears to be sea bobs, and the remainder is about equally divided between the young of P. schmitti and of P. aztecus.

The coast between Parnaiba and Salvador is generally of coral sand with patches of coral a short distance from shore--an environment more suited to spiny lobsters than shrimp. Undoubtedly shrimp do occur in this region but only in small quantities.

A small amount of shrimp are taken from the bay at Salvador for local sale, but the supply is not sufficient for the demand. Shrimp are brought in from Ilheus. The sea bob and the young of the white, pink, and brown shrimp appear in the Salvador market.

The shrimp trawl fishery is confined to southern Brazil from about Rio Doce to Laguna. The fishing spots are scattered at intervals along the coast and usually are adjacent to or near the inland nursery grounds. Boats operating out of Rio de Janeiro bring to market all types of shrimp found in the region, white, pink, brown, dark, and sea bob. The young of several of these species are taken in the bay at Rio de Janeiro, and also at Santos. The sea bob was reported to be most abundant in the harbor at Santos.

At Rio Grande, one of the more important shrimping grounds, the young of the dark shrimp are taken from Lagoa dos Patos and from along the ocean beach while on their way to sea. The annual Brazilian shrimp catch is estimated to run between 20 and 25 million pounds, heads-on weight. About half of this amount comes from the northern fishery, east of the mouth of the Amazon. The remaining half is about equally divided between the catches landed at Rio de Janeiro and Santos and the estuarine fisheries of the south between Cananeia and Rio Grande.

On the northern grounds shrimp are caught throughout the year, but the best season was reported to be from May to October. In central Brazil, at Rio de Janeiro and Santos, shrimp are landed throughout the year (see table 7); there does not appear to be any definite seasonal pattern. Market demand seems to be the controlling factor.

TABLE 7.--MONTHLY LANDINGS OF SHRIMP IN CENTRAL BRAZIL, 1953 AND 1954

(Converted to pounds, heads-on weight)

Month	Santos 1953	Rio De Janeiro 1954
January	141,100	274,300
February	65,700	255,100
March	122,600	258,600
April	81,100	182,300
May	153,400	202,400
June	180,100	232,400
July	88,600	256,400
August	130,500	251,300
September	139,300	218,300
October	91,700	220,500
November	103,600	204,600
December	89,300	329,100
Total	1,387,000	2,885,300

The southern shrimp fishery at Rio Grande is decidedly seasonal (see table 8), the season generally extending from December through May. At this time the young of P. brasiliensis are leaving Lagoa dos Patos for the sea. The intraseasonal pattern is quite consistent in that the heaviest runs almost always occur in March, but the fluctuations in annual catch can be considerable. The 1954 landings, for example, were about 3.4 million pounds, whereas the 1955 landings were over 4.9 million pounds, and the 1956 landings were not expected to exceed 2 million pounds. These fluctuations in landings appear to be the result of biological rather than economic factors. They may be associated with rainfall, since it was reported that excessively rainy years were poor shrimp years, which suggests that excessive quantities of fresh water in Lagoa dos Patos might restrict the area of the shrimp nursery grounds.

TABLE 8.--FRESH SHRIMP, RECEIVED AT PLANTS IN RIO GRANDE, BRAZIL, BY MONTHS, 1953 TO 1955
(Converted to pounds, heads-on weight)

Month	1953	1954	1955
January	130,700	53,600	323,200
February	742,700	592,800	870,200
March	2,436,500	1,941,800	1,911,200
April	765,900	521,200	1,576,500
May	364,000	321,000	168,700
June	20,100	2,000	3,700
July	38,800	-	-
August	(1)	-	900
September	-	-	-
October	-	-	400
November	-	-	-
December	(1)	1,800	3,500
Total	4,498,700	3,434,200	4,858,300

1/ Less than 100 pounds.

OUTLOOK FOR PRODUCTION

Brazil can, and undoubtedly will, increase her shrimp production. It is difficult to estimate the quantity that may be available for export. A certain amount most likely will be exported but the policy has tended towards increasing local consumption rather than encouraging exports. With the exception of less than a thousand pounds of canned shrimp exported to Uruguay, all of the 1955 production was consumed within the country. As the transportation, storage, and marketing facilities increase, the consumption of shrimp is bound to increase.

Little is known about the production possibilities of the area northwest of the Amazon delta, but in all probability the sea bob, a shrimp of small adult size, is by far the most abundant in this area. The sea bob is the most abundant form in the Guianas and in the northern fishery east of the delta. It seems to become progressively more dominant on the nursery grounds as one proceeds north and west along the coast from Sao Luiz, Brazil, to Paramaribo, Surinam. The sea bob is a suitable size for drying; the larger of the species are of cocktail size. The small size of shrimp and the lack of shore and port facilities make it unlikely that this area will become productive in the near future.

The area in the north most likely to increase production is that lying between Baia de Marajo and Sao Luiz. Before production can be increased appreciably, trawling will have to be introduced. Under Brazilian law, however, trawling is not permitted within 3 miles of the coast. Furthermore, tidal currents are strong, and shore facilities are generally lacking. There do seem to be definite possibilities of producing large and jumbo white and brown shrimp. When fully developed, this area could probably produce annually considerably more than twice the estimated current heads-on weight.

Between Parnaiba and Santos there are no extensive estuarine nursery grounds for shrimp, and in many places the feeding grounds for the adults appear to be limited. Perhaps the shrimp catch along this stretch of coast eventually will be twice or more the estimated 5 million pounds, heads-on weight, now taken each year. It seems probable, though, that any catch increase in this area will be for local consumption.

Most of the shrimp now taken in the southern zone between Cananeia and Rio Grande are immature shrimp from the nursery grounds. It is estimated that between 5 and 10 million pounds, heads-on weight, of shrimp are caught in this area each year. This amount can probably be doubled or tripled providing suitable trawling grounds can be developed at sea.

FISHERMEN AND GEAR

There are probably about 20 thousand fishermen, all part-time, catching shrimp in Brazil. Of this number, about 12 thousand are employed

in the northern fishery and about 2 thousand at Rio Grande in the southern fishery. Almost all the rest of the fishermen are located south of Rio de Janeiro.

In the northern fishery shrimp are taken with stop seines and trap nets. The stop seine consists of a series of upright stationary poles, between which is strung a wall of mesh, usually 500 to 600 fathoms long and 8 or 9 feet high. It is fished on the outgoing tide, and the catch is usually against the webbing. Trap nets are fished on both outgoing and incoming tides. A trap net is a tapering rectangular bag of webbing usually 15 to 20 feet square at the mouth and 2 or 3 feet at the end. The sides of the mouth are suspended between two fixed vertical poles, and the bottom is pushed into the mud and held there by other poles. The two fixed poles are usually braced by other poles, and frequently a runway is constructed along the top to ensure better management of the net. Sometimes three or four nets are fished in a row.

Near Rio Grande, in the southern fishery, trap nets and beach seines are used. The beach seines are about 80 fathoms long and 3 fathoms deep. On occasions two or three of the seines may be fastened together to form one net. From 12 to 20 men will work a seine.

Trawlers, some using otter trawls and others working in pairs with a paranzella-type trawl, operate from the ports of Rio de Janeiro and Santos. These trawlers do not fish exclusively for shrimp.

PROCESSING AND MARKETING

Considerably more than half the Brazilian shrimp catch is sold in the semidry state. The shrimp are boiled in brine and dried for only a day or two. They are salted well before shipping to market. Probably more dried shrimp are handled in Belem than in any other port. The shrimp arrive there in large baskets which hold about 65 pounds. They are sold at auction, usually held each Friday. Since the shrimp are only partially dried, spoilage is rapid, and considerable quantities are lost each year. Retail prices, according to quality, ranged from about $2\frac{1}{2}$ cents to over 60 cents a pound (values are in United States currency). Partially dry shrimp from the southern fishing grounds were retailing in the Porto Alegre market for about 25 cents a pound.

Figure 3.--Shrimp for sale in market at Salvador, Brazil.

Figure 4.--Baskets of dried shrimp in market at Belem, Brazil. The price is in cruzeiros per kilogram.

The retail price of whole fresh shrimp varied considerably by locality. A pound of small shrimp was selling in the markets at Sao Luiz for about 5 cents; in Rio de Janeiro from 19 to 22 cents; in Salvador for 31 cents; and in Santos for about 37 cents. In Rio de Janeiro the wholesale price of whole fresh shrimp was fixed. For small shrimp it was about 9 cents, for medium, about 13 cents, for large about 22 cents a pound. The allowable retail mark-up was 30 percent above the wholesale price; however, actual retail prices usually included a mark-up considerably in excess of that allowed.

A few shrimp are frozen in Sao Luiz; the only processing elsewhere is done at Rio Grande. Here, about six companies engage in shrimp canning, and three freeze. The shrimp are small. The peeled meats run about a hundred to over five hundred to the pound.

Some canners scald the shrimp before heading and peeling and then blanch the meats, cool them, place the meats in cans, and process. Other plants head and peel the raw shrimp and then proceed with blanching, etc. By either process the ultimate yield of meats, blanched and ready to can, usually is between 24 and 25 percent of the whole raw shrimp.

Two types of peeled shrimp are frozen in Rio Grande, one raw and the other scalded. The yield of the peeled raw shrimp is about 46 percent of the whole weight and that of the peeled scalded about 40 percent. Scalding is done before peeling. The meats, either scalded or raw, are placed in a plastic bag and then in a carton. The cartons, after freezing, are overwrapped.

The plants were paying between 5 and 6 cents a pound for the whole shrimp. Women were paid about 3 cents a pound, peeled basis, for peeling the shrimp. Wages of permanent plant laborers averaged between $30 and $40 a month. 5/ The package of frozen raw-peeled shrimp was retailing in Sao Paulo for about 30 to 35 cents.

5/ Clerical personnel in Sao Paulo were receiving between $50.00 and $75.00 monthly.

FOREIGN TRADE AND GOVERNMENT CONTROL

Brazil neither imports nor exports appreciable quantities of shrimp. In 1954 only 600 pounds of dried shrimp were imported, all from the United States. In 1955 there were no imports of shrimp. There were no shrimp exported in 1954 and less than a thousand pounds of canned shrimp were exported to Uruguay in 1955.

Imports, exports, and foreign exchange are controlled, and both import and export taxes are levied. Before shrimp can be exported, permits must be secured from the Game and Fish Department and from the Bank of Brazil. Exchange earned from exports must be delivered to the Bank of Brazil. Payments for the exchange are made at the official buying rate plus an additional rate depending upon the classification of the exported item. Shrimp are in the fourth category, for which the additional rate is 31.70 cruzeiros. This plus the official rate of 18.36 cruzeiros amounts to 50.06 cruzeiros to the U. S. dollar. The free-market exchange was 73 cruzeiros for one U. S. dollar.

Only Brazilians are permitted to fish in Brazil, and only Brazilian companies can trade in fishery products. However, a temporary 2-year permit has been granted a United States citizen for exploratory fishing with two boats of United States registry. Seventy percent of the catch of these boats must be sold in Brazil.

BRITISH GUIANA 6/

The present catch is mostly very small shrimp, the peeled and dried meats of which will average around a thousand to the pound. The sea bob is most abundant towards the eastern boundary, though apparently not as plentiful as in Surinam. The estimated annual catch is about 800 thousand pounds, heads-on weight. Production possibilities appear to be about 4 to 5 million pounds, heads-on basis. Increased production is unlikely unless an export market can be developed for dried shrimp. A small amount of frozen shrimp will probably be exported in the near future.

COMMERCIAL SPECIES AND FISHING GROUNDS

In British Guiana the most abundant commercial forms are two species of very small shrimp, known locally as "white bellies" or "fine" shrimp. They are Palaemon schmitti and Hippolysmata oplothoroides. The dried and peeled meats of these shrimp average about a thousand to the pound. The sea bob, Xiphopeneus kroyeri, the white shrimp, Penaeus schmitti, and the brown shrimp, P. aztecus, appear occasionally in the catches near Georgetown. These larger forms, including the sea bob, are called "coarse" shrimp. Probably less than 5 percent of the catch from the Demarara River fishery is "coarse" shrimp. The sea bob is reported to be abundant only near the Surinam border between the Berbice and the Courantyne Rivers. White and brown shrimp are scarce.

The fishing grounds are near the mouths of the Essiquibo and the Courantyne Rivers. The catch is estimated to be about 800,000 pounds, heads-on weight, a year.

About 300 fishermen using Chinese trap nets fish the entire year for shrimp and small fish.

OUTLOOK FOR PRODUCTION

The British Guiana shrimp fishery, when fully developed, probably can produce 4 or 5 million pounds, heads-on weight, a year. Owing to the small size of the more abundant species, the probability is slight that this yield will be attained in the near future, unless a profitable export market can be found for the dried shrimp.

It can be expected that some frozen brown and white shrimp will soon be exported. The quantities probably will not be great.

6/ The survey of British Guiana was made during May 1956 and this date is implied when current events or prices are alluded to.

BRITISH GUIANA SHRIMP SPECIES
AND LOCATIONS

2 Penaeus aztecus

9 P. schmitti

11 Xiphopeneus kroyeri

20 Palaemon schmitti

21 Hippolysmata oplothoroides

BRITISH GUIANA

PROCESSING AND MARKETING

Most of the shrimp are dried, but many are sold fresh-whole in the Georgetown markets and by peddlers. The "fine" shrimp and small fish caught by the trap nets are used by the poorer classes. Fresh shrimp, in Georgetown, are sold by the parcel, which varies in size, depending on abundance. Generally it is about two handfuls. The price does not vary. It is a standard 8 British West Indian (B.W.I.) cents 7/ (about 5 U.S. cents). The price for one white shrimp, approximately 6 inches in total length, is 6 B.W.I. cents (about 3½ U.S. cents).

Figure 5.--A shrimp and fish vendor in Georgetown, British Guiana. These tiny shrimp are sold by the "parcel," generally about two handfuls.

7/ Conversion rate of the B.W.I. dollar is 1.70 B.W.I. = United States $1.00.

About 10 pounds of raw fine shrimp are required to produce 1 pound of peeled dried shrimp. One plant in Georgetown steams the shrimp with salt in a barrel and dries them in the sun on a concrete floor. The dried shrimp are peeled in an electrically driven rice-huller. Most of this product was exported to Trinidad where it sold for about 64 cents per pound. However, dried shrimp from Surinam selling for 35 to 41 cents per pound has taken this market. The fishermen were paid $2\frac{1}{2}$ to $3\frac{1}{2}$ cents per pound for the raw shrimp.

The government is constructing a wholesale market and landing wharf in Georgetown where cold storage rooms will be provided for the use of the fishermen. There will also be a few bunks and a small canteen available in this market. The proposal is to require all boats to land at the dock. A charge of 6 percent on sales will be levied to cover the cost of services. The selling price will not be under government control.

The skiffs used by the shrimp fishermen generally are powered by outboard motors. Gasoline costs 46 cents a gallon of which 19 cents represents tax which is refunded to the fishermen. Net cost to the fishermen is, therefore, about 27 cents a gallon.

It was reported that a United States fisherman was to bring in four trawlers. These boats will fish for the export market. The product will be fish fillets and perhaps some shrimp.

An estimated 6,000 pounds of dried shrimp were exported to Trinidad in 1955. These were the only shrimp exports from British Guiana.

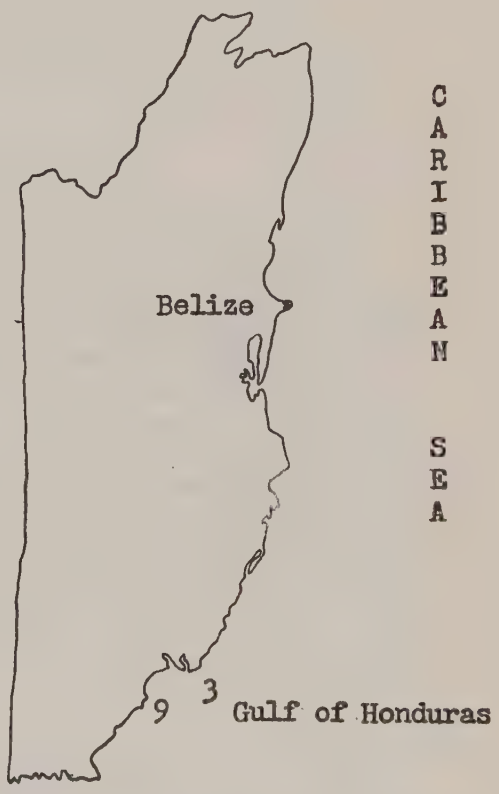
BRITISH HONDURAS

British Honduras was not visited during the course of this survey. However, it is not expected that British Honduras will produce any quantity of shrimp. Reports from various explorations indicate that pink shrimp, Penaeus duorarum, and probably P. schmitti, occur in coastal waters. They have never been reported in the abundance that would warrant the development of a trawl fishery. The shrimp usually are found well dispersed. This condition seems to be prevalent throughout most of the continental shores bordering on the Caribbean Sea. Perhaps this area may eventually produce 200 thousand pounds or so of shrimp a year.

BRITISH HONDURAS SHRIMP
SPECIES AND LOCATIONS

3 Penaeus duorarum

9 P. schmitti



BRITISH HONDURAS

CHILE SHRIMP SPECIES
AND LOCATIONS

18 Rynchocinetes typus

19 Heterocarpus reedi

CHILE 8/

Chilean shrimp production is insignificant in comparison with the total fish catch. In 1954 about 223 thousand pounds of shrimp were landed as against a total fish catch of over 230 million pounds, round weights. All of the shrimp caught are consumed locally.

There are at least three species of crustacea found in Chilean waters that can properly be called shrimp. In addition to the shrimp there is the "langostino" (probably several species of the family Galatheidae, the most important of which appears to be Cervomunida johni) which is not truly a shrimp. The yield in cooked peeled meats per unit weight of live animal is about 13 percent for shrimp but only 7 percent for the langostinos.

The prospect of increasing the shrimp catch in the present areas of operation appears favorable. It is highly probable that new fishing areas will be found as the market grows. The prospect for an increase in production for export purposes seems to be more immediate and more likely in the case of the langostino. It is probable that the langostino occurs in abundance over a great length of the Chilean coast.

COMMERCIAL SPECIES AND FISHING GROUNDS

There are at least three species--and probably more not yet identified--that can properly be called shrimp. The shrimp nearest shore (taken in depths to 30 fathoms) is called the beach shrimp, "camaron de la playa." The species Rynchocinetes typus is a small shrimp that runs a hundred or more to the pound, headless. It is of minor importance and is usually taken by traps and sold alive to nearby taverns and restaurants.

The pink or nylon shrimp, Heterocarpus reedi, is a recently described pandalid shrimp, pink in color, occuring in depths between one and two hundred fathoms. This also is a small species, though somewhat larger than the beach shrimp. These shrimp are fished for only on occasions as the market demands; they are brought in whole, without ice, and sold cooked-peeled, either fresh or frozen.

8/ The survey of Chile was made in October 1955 and this date, unless otherwise specified, is implied when current events or prices are alluded to.

There is still another shrimp, the "gamba" (probably a pandalid), which is bright red and which occurs in depths beyond 200 fathoms. It is larger than the other two forms, and the largest specimens are reported to run 20 to 25 to the pound, fresh headless. The species has only been taken experimentally, although one fisherman stated that the best hauls he made averaged about 2,000 pounds of whole shrimp per hour, with a 50-foot trawl. This shrimp appears to be the most promising for future export markets. One boat was being outfitted by a private company to fish for it.

These three forms (and probably some yet unidentified) comprise the shrimp fishery, which is small and for local consumption. The 1954 catch was about 220 thousand pounds of whole shrimp.

The principal shrimp ports are Antofagasta, Valparaiso, and San Antonio.

In addition to the shrimp there is the langostino 9/ (probably several species of Galatheidae, the most important of which appears to be Cervomunida johni) which is not truly a shrimp. 10/

The langostino occur in the same general habitat as the hake. They are usually taken at around 80 fathoms. The fishery for them began in 1953 when about 2.1 million pounds were taken. In 1954 over 5.7 million pounds were caught, some of which were canned as "rock lobster tails".

The Chilean shrimp production (table 9) is insignificant in comparison with the total fish catch. In 1954, the total Chilean fish production excluding shellfish was 230.1 million pounds of which the hake amounted to 123.7 million pounds. In the same year, shellfish production was 86.2 million pounds, of which shrimp amounted to about 223 thousand pounds and langostinos about 5.8 million pounds. These are round weights.

9/ The langostino, in frozen cooked-peeled form, entered the United States market during 1956.

10/ Throughout Latin America the generally used terms are "langostino" for large shrimp and "camaron" for small shrimp. This is equivalent to the English usage of prawn and shrimp. There are variants from this, however. In Mexico, for example, the word for all marine shrimp, irrespective of size, is "camaron," and fresh-water palamonid shrimp are known as "langostinos". In Chile, "camaron" is used for both salt-water and fresh-water shrimp, and "langostino" is reserved for crustaceans of the family Galatheidae.

TABLE 9.--PRODUCTION AND VALUE TO FISHERMEN OF CHILEAN SHRIMP, BY YEARS, 1945 TO 1954
(Converted to pounds, heads-on weight)

Year	Pounds	Value in 1,000 pesos 1/
1945	116,000	1,701
1946	113,500	1,803
1947	182,800	3,162
1948	78,900	1,770
1949	69,200	1,647
1950	52,900	1,568
1951	35,900	1,684
1952	48,100	2,175
1953	57,300	3,388
1954	222,700	10,940

1/ Exchange rates varied too greatly to permit conversion into American currency.

Source: Ministerio de Agricultura, Direccion General de Pesca y Caza, Republica de Chile.

There is a closed season on shrimp from September 1 to December 31 in the area between Quintero and Quintay near Valparaiso.

OUTLOOK FOR PRODUCTION

The prospects of increasing the shrimp catch in the present areas of operation appears favorable. Difficulty in finding a profitable market seems to be the principal cause for lack of development. It is highly probable that new fishing areas will be developed as the market grows. The possibilities of developing a fishery for the large red shrimp are still unknown since the fishing grounds and the abundance have not been established with any degree of certainty.

The expansion of the shrimp fishery will probably depend more on the domestic than on the export market. The prospects for an increase in production for export seem to be more immediate and more likely in the case of the langostino, but little is known about the life and habits of the langostino or of its distribution and abundance. It is probable that the langostino occurs in abundance over a great length of the coast. More than 5.7 million pounds were taken in 1954.

FISHERMEN AND GEAR

There are no full-time shrimp fishermen in Chile. Perhaps a hundred men may fish occasionally for shrimp and langostino. In 1954 there were about 13,700 people working in the fishing and whaling industries, of which about 9,100 were fishermen and 4,600 worked ashore in the plants. The fishermen are paid fixed wages, and a bonus when the catches exceed a set quota.

Figure 6.--Trawlers in port - Valparaiso, Chile.

As there are no full-time shrimp fishermen in Chile, there are no boats dedicated exclusively to shrimp fishing. Some trawlers are used exclusively for hake, others fish for hake and occasionally langostino, and less frequently a try will be made for shrimp. In 1954 there were 42 trawlers operating in Chile; all but one operated along the central coast between Valparaiso and Talcahuano. When hake are abundant the fishing for langostino and shrimp becomes very sporadic and depends upon market demand.

The nets used for shrimp and langostino are similar in design to the hake trawl except that the meshes are smaller. The trawl is the typical VD type with about 260-foot leads between the net and the doors. The meshes are 2 inches (stretched) throughout the net. The wings are of 18-thread single mesh and the bag of 42-thread double mesh.

PROCESSING AND MARKETING

The trawlers, when fishing for shrimp or langostino, leave early in the morning and return in late afternoon on the same day. No ice is used, and the catch is not headed at sea. Shrimp and langostinos are handled in the same manner. Upon arriving at the plant they are immediately boiled in sea water, allowed to cool, and then headed and peeled by hand. Most of the meats are placed in cold storage in plastic bags for sale the next morning. Those destined for freezing are layer-packed in stainless-steel trays holding 7 ounces of meats, then covered with water and frozen.

In 1954 about 60 thousand pounds of whole shrimp were processed. The yield was about 13 percent of this amount in cooked-peeled meats. Langostinos apparently yield only about 7 percent of cooked-peeled meats per unit weight of the live animal.

The local demand for langostinos has increased rapidly during the past three years. Before 1953 so few were sold that no production records were kept. In Santiago in September and October 1955, however, they were on almost all menus in the majority of the restaurants.

Langostinos are mostly marketed cooked-peeled or frozen cooked-peeled, though some are canned and some sold raw whole. The popular retail style in Santiago is cooked-peeled in transparent plastic bags of 1 kilogram (2.2 pounds) which retails for about 60 cents at the free rate of exchange, October 1955.

The cooked meats are cocktail size and flattened rather than cylindrical like shrimp and prawn.

There is no government inspection or supervision for either grades or quality control.

FOREIGN TRADE

Chile does not export shrimp in any form. There are no export taxes on shrimp. Export permits are required for all fishery products, and quotas for the local markets must be fulfilled before export permits are granted. Local price ceilings apply to shrimp and other seafoods. Langostinos exports to the United States began in 1956.

The fishing and whaling industries, by special decree and for a period of 10 years from August 3, 1953, are the only industries in Chile which may freely use foreign exchange derived from export sales. If a company makes use of this privilege, it may not take advantage of the official foreign-exchange rate for importation of machinery, boats, and fishing gear. Some fishing companies take advantage of this foreign-exchange privilege while others do not. Their decision is based mostly on anticipated imports of machinery and equipment.

Since 1949, Chile has not imported any fish or fishery products (including shrimp). This was accomplished first by not including these items in the foreign-exchange budget and later by direct prohibition. Previously, small amounts of canned and dried shrimp were imported from the United States, but the amounts were never appreciable. Any exports of shrimp to Chile that may show in United States statistics are most probably under diplomatic free entry.

SOCIAL LEGISLATION AS IT AFFECTS THE FISHING INDUSTRY

Chile has advanced social legislation. Almost all production workers and white-collar employees, with the exception of the majority of the fishermen, belong to "Cajas de Provision Social" (Social Security Joint Funds). There are a number of such Cajas in Chile. The employed contribute funds that vary from 7 percent to 14 percent of their wages, and the employers contribute in like or greater amounts, depending upon the Caja. The funds provide for retirement annuities and, depending on the Caja, varying degrees of medical attention.

The fish-plant workers usually belong to a Caja and some of the larger fishing companies have their fishermen in the "Caja de la Marina Mercante" (Merchant Marine Joint Fund). The vast bulk of the fishermen are still unprotected, although the government is attempting to extend coverage to them under the "Caja de Seguro Social." The difficulty that is being encountered in this connection is that since these fishermen do not have an employer they must contribute 22 percent of their earnings under the law. A further complication is the fact that it is extremely hard to establish a satisfactory wage or earning base.

Along the northern coast of Chile the fishermen's labor unions are quite strong and active. The central and southern coasts do not have many unions, but the tendency is for them to increase. Many of the plant workers are not unionized.

GOVERNMENTAL ASSISTANCE TO THE FISHING INDUSTRY

Although no emphasis has been placed on shrimp, the Chilean Government has shown much interest in developing the fishing industry in general. This has been manifested thrcugh the activities of CORFO (Industrial Development Corporation) and through special legislation.

CORFO began fishing operations in 1939 and, in 1942 started a trawling company for hake. Now that fishery enterprises are well established in Chile, CORFO is gradually withdrawing. The Corporation was reported to be selling all enterprises with the exception of the operation in San Antonio where work will be devoted primarily to exploratory trawling for hake in areas not now fished.

Decree No. 208 of July 21, 1953, grants special privileges to the fishing industry, some of which are as follows:

1. Small boat owners, who operate their own boats, are exempt from certain taxes for a period of 10 years from date of publication of the law.

2. For this same period, fishing and fish-processing industries (a) are exempt from certain excess-profits taxes and exempt or subject to reduced rates on several other taxes, (b) have free use of foreign exchange (but if they use this privilege they are not entitled to official exchange on importation of machinery, boats, or fishing gear), and (c) are subject to minimum charges for port costs, their boats, use of radio-telephone equipment, and pilotage fees.

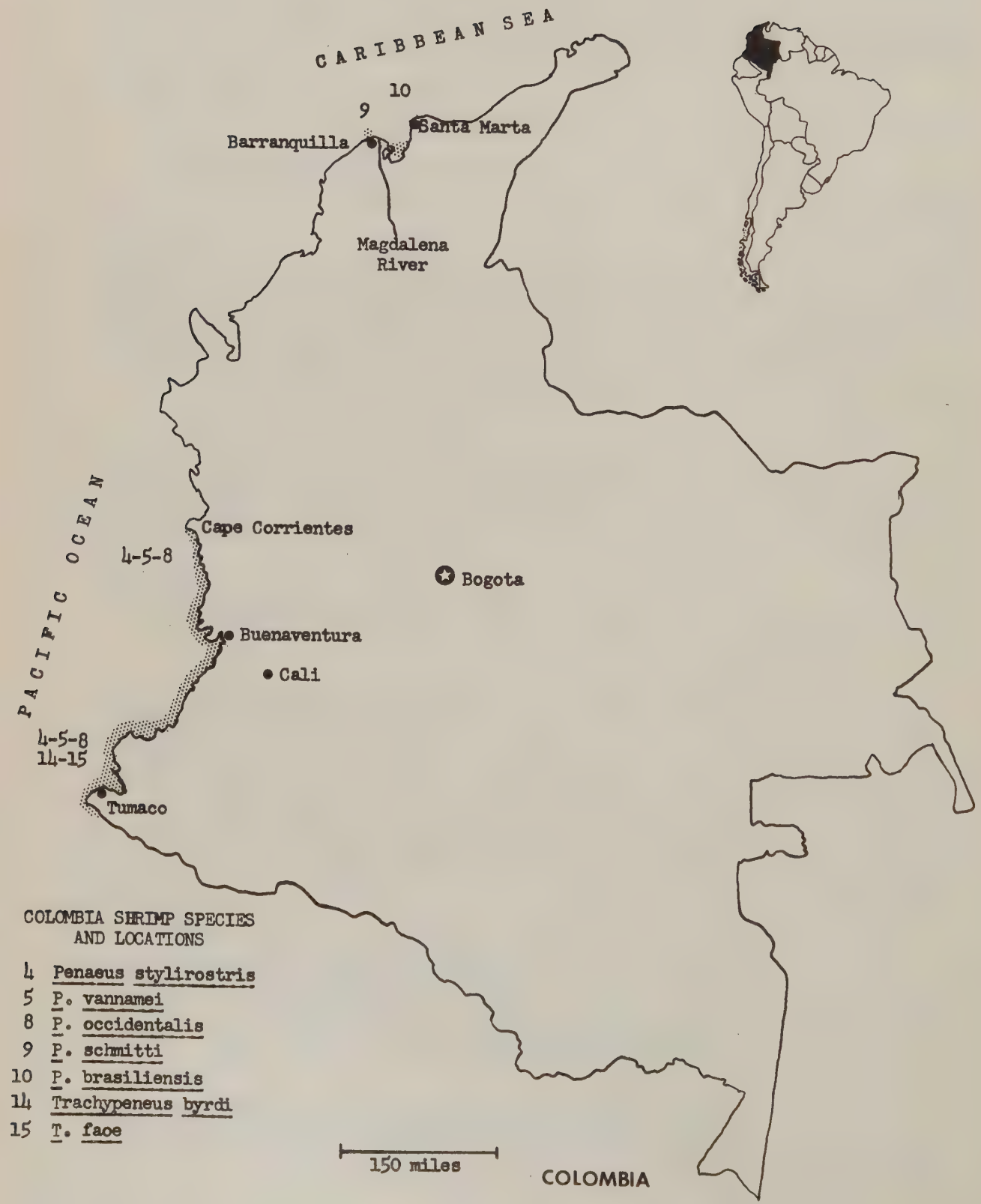
3. The fishing industry and other industries which use at least 80 percent raw materials coming from the sea are exempt from ad valorem import duties, custom and consular fees on boats, engines, fishing gear, refrigeration equipment, packing equipment, containers, etc.

4. The State Bank, for a period of 5 years from publication, may grant credits up to 20 million pesos to registered fishermen who have been fishing more than 1 year.

5. Authority is given the President to expropriate lands adjacent to the sea for construction of low-cost housing for fishermen and for fishery schools. (In Valparaiso, the Government has recently completed a fishery center for small-boat owners which includes some 20 individual locker rooms for the fishermen for storage of fishing gear and equipment; toilets and baths; a general-assembly room; and offices for the directors and the local fishery inspector. It is planned to extend this to include storage and marketing facilities for the fishermen.)

In addition to this special legislation on fishery enterprises, the Chilean Government has legislation designed to induce foreign capital to invest in Chile. This legislation grants exemption from certain import fees, provides means for withdrawing profits and capital investment from the country, and provides various other concessions for foreign investments.

The government allows special low rates for the shipment within the country by rail of low-priced fishery products. Shrimp are not included in this category.


CARIBBEAN SEA
10
9
Barranquilla
Santa Marta
Magdalena River
PACIFIC OCEAN
Cape Corrientes
4-5-8
Bogota
Buenaventura
Cali
4-5-8
14-15
Tumaco
COLOMBIA SHRIMP SPECIES AND LOCATIONS
4 Penaeus stylirostris
5 P. vannamei
8 P. occidentalis
9 P. schmitti
10 P. brasiliensis
14 Trachypeneus byrdi
15 T. faoe
150 miles
COLOMBIA

COLOMBIA 11/

The shrimp production from the Caribbean coast of Colombia has but slight prospects of increasing. The Pacific coast, with adequate facilities and government assistance, could probably produce between 3 and 6 million pounds annually of large and jumbo shrimp tails. Shrimp species of smaller size perhaps could produce a like amount. The 1954 catch was about 500 thousand pounds, headless. There are only five trawlers operating along the Pacific coast and none on the Caribbean.

COMMERCIAL SPECIES AND FISHING GROUNDS

There appear to be only two species of shrimp taken for commercial purposes on the Caribbean coast of Colombia. These are Penaeus schmitti, the young of which are taken from lagoons near the mouth of the Magdalena River, and P. brasiliensis, which is caught, also only the young, from La Cienega Grande de Santa Marta. La Cienega is an extensive marsh lying between Barranquilla and Santa Marta.

Along the Pacific coast P. occidentalis is the predominant commercial species. Two other white shrimp, P. stylirostris and P. vannamei, also occur but apparently are not very abundant. Some of the larger "zebra" shrimp, Trachypeneus byrdi and T. faoe, are sometimes kept by the trawlers; more often they are discarded along with the sea bob, Xiphopeneus riveti.

The Pacific fishing grounds extend from Cape Corrientes to the Ecuadoran border. Tumaco Bay, in the south, is one of the better, if not the best, fishing areas. The trawlers will sometimes fish in 10 or 12 fathoms, but nearly all fishing is done between 3 and 6 fathoms.

No official catch records are gathered. The shrimp catch from the Caribbean coast is estimated to range between 600,000 and a million pounds annually, heads-on weight. By far the bulk of this catch is from La Cienega. The fishermen claim that the best shrimping season is during the dry period from about January through May. When rains are not too heavy and the marsh water does not become too sweet, the fishermen catch some shrimp the entire year. During flood periods they are unable to find the young shrimp.

11/ The survey of Colombia was made during May 1956, and this date, unless otherwise specified, is implied when current events or prices are alluded to.

The Pacific-coast catch is estimated not to exceed 500,000 pounds annually, headless weight. The best fishing season usually is between May and November.

OUTLOOK FOR PRODUCTION

The Caribbean shores of Colombia appear to be producing about as many shrimp as they likely will in the near future. Prospects of developing a trawl fishery for shrimp are poor. Where the white shrimp (Penaeus schmitti) occur, trawling grounds are few and weather conditions unfavorable. In the ocean areas adjacent to the brown-shrimp (P. brasiliensis) nursery grounds, the bottom is sandy and the shrimp apparently are scattered. Reports of experimental trawling off La Cienega indicate that the shrimp are not concentrated.

Prospects in the Pacific, on the other hand, are quite good, providing certain governmental policies are settled. The west-coast annual production can probably be developed to produce from 3 to 6 million pounds, headless weight, of large and jumbo shrimp. In addition, if markets can be developed for the species of smaller size, perhaps this amount might be doubled.

FISHERMEN AND GEAR

On the Caribbean coast there are about 200 fishermen engaged in part-time fishing for shrimp. On the Pacific there are about 35 full-time fishermen.

In La Cienega the men fish at night near the inlet to the sea. They use a triangular semifixed net each side of which is 10 to 15 feet long at the mouth. The mouth of the net is held open by two poles sunk in the mud and lashed together at the top to form an inverted V. The body of the net is 20 to 25 feet long and tapers to about 3 feet at the end where it is tied off. The net is usually supported by lines running from the poles to mangroves or to other poles sunk in the mud. The tidal currents are not strong, and fishing is done on both outgoing and incoming tides, the nets being emptied every hour or so. The fishermen operate from dugouts. No ice is used by the fishermen, but every few hours they deliver their catch to the "buy-boats" where it is iced.

Figure 7.--Triangular trap nets used by Colombian fishermen for catching shrimp near Barranquilla, Colombia. The nets shown in this photograph are in an inverted position from that used when fishing.

The fishermen are paid by the measure which contains about 4½ to 5 pounds of whole shrimp. Price varies according to demand, ranging between 1 and 3 pesos 12/ (about 21 to 63 cents) a measure.

There are five shrimp trawlers on the Pacific coast, three of which have freezing facilities. The trawls are the Gulf of Mexico flat design with a spread of 75 to 95 feet at the mouth. Lazy lines are used and one trawler, at least, uses 14-foot leaders between the wings and the doors. Fishing is performed only during daylight hours. The freezer ships usually pack and freeze after nightfall.

12/ The free-market rate of the peso fluctuates almost daily. It averaged in May 1956 about 4.60 pesos to the United States dollar.

Payment to the fishermen varies with boat owners. Some are paid on a share basis on pack-out weight, and some are paid a flat monthly salary. One owner hires only the captain, who is paid a fixed amount per pound on pack-out weight. The captain employs the crew, provides the groceries, and pays the wages. The owner takes care of all other expenses. Another owner provides the food and defrays all other expenses and pays the captain a set amount per pound of tails. The remainder of the crew are paid monthly salaries that range from 100 pesos (about $22) for hands to 300 pesos (about $65) for the engineer.

The ex-vessel price for headless frozen shrimp in Buenaventura was 1.80 pesos per "libra" 13/ (about 36 cents a pound).

PROCESSING AND MARKETING

Caribbean coast

Most of the catch from the Caribbean coast is sold in nearby markets as heavily salted cooked whole shrimp. The fresh shrimp are cooked in brine and after cooling are sprinkled with salt. Some shrimp are canned; some are cooked, peeled, and frozen; and some are dried.

There are two small canneries, one in Barranquilla and the other in Santa Marta, that occasionally can shrimp for local consumption. The salted, cooked, and peeled meats, on arriving at the cannery, are sweetened in fresh water and then canned. The dry-pack in parchment-lined 5-ounce cans is the customary type of pack.

Some cooked and peeled shrimp, destined for consumption in the interior of the country, are frozen in a small plant in the town of La Cienega. The raw whole shrimp are boiled in fresh water. After peeling, the cooked meats are soaked for 1 to 2 hours in concentrated brine. They are then placed on hardware-cloth trays to drain and later are frozen. The frozen meats (each unit weighing 7 ounces) are placed in plastic bags and slipped into unwaxed cartons. This pack was retailing in Bogota and Cali from 3 to 4 pesos (about 65 to 87 cents). Headless frozen shrimp from the Pacific of under 15 count were retailing for about 3 pesos (65 cents) a pound. The cooked and heavily salted whole shrimp from La Cienega was retailing in the Barranquilla market for 50 centavos to 1 peso (about 10 to 20 cents) a pound depending on daily supply.

13/ The Colombian "libra" or pound is 500 grams or equivalent to about 1.1 United States pounds.

Cannery workers are furnished certain items of clothing, and the women are paid from 2 to 2.50 pesos (about 43 to 59 cents) daily while the men receive 4 to 5 pesos (about 87 cents to $1.09). They work 48 hours a week but are paid for 56 hours. There is no social security, but the employers must pay for hospital and medical services.

The women at La Cienega who peel cooked shrimp for freezing are paid by the measure. A measure will yield about 1.1 pounds of peeled meats for which the women received about 30 centavos (7 cents). These shrimp are quite small, averaging about 3 inches in total length.

Pacific Coast

There is a small cannery in Tumaco that dry-packs some shrimp for consumption within Colombia. Here the shrimp arrive at the cannery raw headless. They are peeled, blanched in boiling brine for 20 to 30 minutes, cooled--and the larger ones deveined--then placed in parchment-lined cans and processed at 15 pounds for 50 minutes after a 10-minute heating-up period. The "zebra" or "tiger" shrimp are usually used for canning.

The minimum daily wage in Tumaco is 1.60 pesos (about 33 cents) for women and 2 pesos (43 cents) for men. The workers also receive 45 days extra pay a year and medical care at the expense of the employer. There is no social security.

Almost all of the shrimp catch from the Pacific is frozen aboard vessels, although some are frozen in a shore plant at Buenaventura. Shrimp for export are layer-packed in 5-pound cartons, as are some of the shrimp for sale within Colombia. Some of the shrimp for sale within the country are frozen in 50-gallon drums, in blocks of about 100 pounds. These blocks are wrapped in burlap and covered with a rubberized cloth to protect them during air shipment to Cali. On arrival in Cali the shrimp are defrosted, washed, and refrozen in blocks containing about 150 pounds of shrimp. The second freezing is done in tins used for making block ice.

Aboard one boat the shrimp are headed immediately after capture and placed in chilled brine until evening. They are then sorted, layer-packed, and frozen in 5-pound boxes and given a solid glaze.

The ex-vessel price for frozen unsorted tails, averaging between 8/10 to 16/20, wrapped in burlap, was 1.80 pesos (about 36 cents) a pound.

FOREIGN TRADE

Exports are controlled. Based on the declared value at time of export, the foreign exchange received from the sale of shrimp abroad is paid to the exporter in pesos at the official rate of exchange. The official rate of exchange is 2.50 pesos for 1 dollar. The practice for export purposes has been to value the shrimp at 30 cents a pound. It was reported that official circles were objecting to this practice because the valuation was too low.

In order to increase local supply and to lower prices, restrictions were placed on the amount of shrimp that could be exported during the first 4 months of 1956. The quantity to be exported apparently was determined arbitrarily, as there was no set or published rule as to the amount that could be exported for any one time period.

Export licenses are required, but export duties are applicable only to bananas, coffee, and hides. No exports of shrimp were reported before 1953. In that year about 227,000 pounds of frozen shrimp were exported to the United States. In 1954, exports amounted to 357,000 pounds, nearly all of which were shipped to the United States.

Import duties, both specific and ad valorem, stamp tax, and prior deposit apply to imported shrimp as also do consular fees and import permits.

The entrance of prepared or canned shrimp was prohibited in February 1955. The specific import duty on fresh, cooked, or salted shrimp is 1 peso per gross kilogram (2.2 pounds). The ad valorem duty is 25 percent of the c.i.f. value. Both duties are payable at the official rate of exchange of 2.50 pesos for 1 dollar. Consular fees are 1 percent of the f.o.b. value.

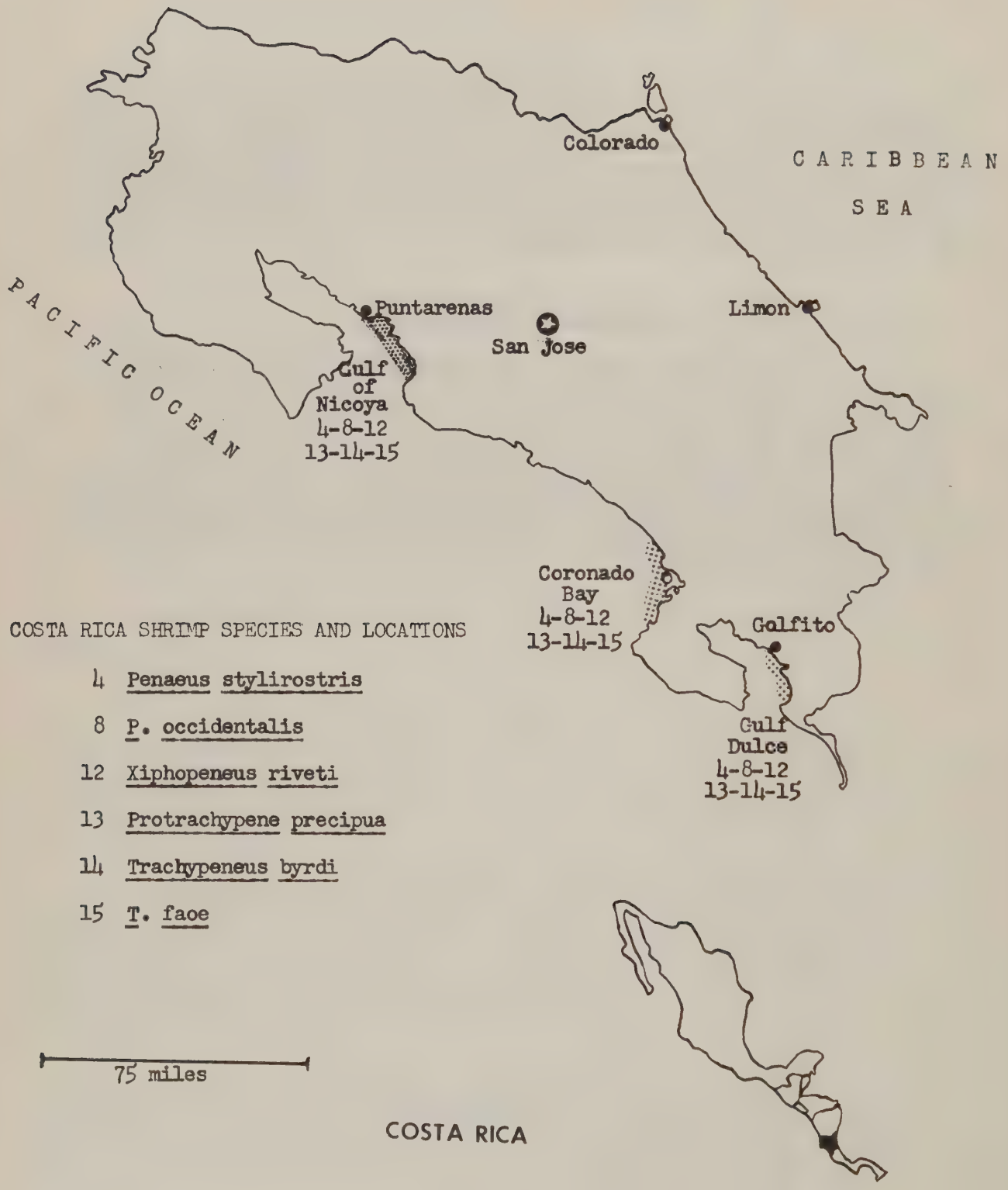
Before import permits are granted, the prior deposit must be made and the stamp tax paid. These charges are based on the f.o.b. value of the shipment; for shrimp, which is in the third group, the foreign exchange must be purchased in the open market. 14/ For import items listed in the third group, the prior deposit was 80 percent and the stamp tax 80 percent of the f.o.b. value.

14/ There are a preferential list of items, a prohibited list, and four other groups of import classifications. Exchange at the official rate of 2.50 pesos to the dollar can only be obtained for imported items that are on the preferential list.

In the Colombian import records, shrimp are grouped with all crustaceans and mollusks. In 1954 only about 1,000 pounds of fresh or dried crustaceans and mollusks were imported, of which about 50 pounds came from the United States, about 900 pounds from Japan, and the remainder from other countries. Of a total import of about 60,000 pounds of canned crustaceans and mollusks, about 40,000 pounds were reported as originating in the United States.

GOVERNMENTAL ASSISTANCE

Colombia has not (May 1956) established a set of procedures for the development or management of the shrimp fisheries. Foreign-flag trawlers are issued month-to-month permits to operate. It was reported that the permits may, at times, be for as short a period as 20 days. It was also reported that regulations were being considered for the purpose of encouraging fishing operations. Under consideration, in this regard, was a proposal to establish a fund for loans to private individuals or organizations for the purchase of processing plants, fishing vessels, gear, etc.


Colorado
CARIBBEAN
SEA
PACIFIC OCEAN
Puntarenas
San Jose
Limon
Gulf
of
Nicoya
4-8-12
13-14-15
Coronado
Bay
4-8-12
13-14-15
Golfito
Gulf
Dulce
4-8-12
13-14-15
COSTA RICA SHRIMP SPECIES AND LOCATIONS
4 Penaeus stylirostris
8 P. occidentalis
12 Xiphopeneus riveti
13 Protrachypene precipua
14 Trachypeneus byrdi
15 T. faoe
75 miles
COSTA RICA

COSTA RICA [15/]

Shrimp fishing for export to the United States is on the increase in Costa Rica. Fishing grounds are limited, and it is estimated that only 1 to 2 million pounds, headless weight, can be produced a year. The 1955 catch was slightly over 300,000 pounds, headless weight. Fishing occurs only on the west coast; the east coast is not expected to produce much. Foreign-flag vessels are permitted to fish in Costa Rica.

COMMERCIAL SPECIES AND FISHING GROUNDS

Commercial shrimp fishing in Costa Rica is limited to the Pacific coast, where six species of shrimp appear more or less regularly in the catches. Penaeus occidentalis and P. stylirostris attain the largest size, are sought more, and consequently are the most important commercially. These white shrimp, called "camaron blanco," are the only species exported. About 75 percent are under 15 to the pound, headless, and 25 percent are 16 to 20. Sizes smaller than 16-20 are rarely caught by the fishing fleet.

The smaller-sized species, Trachypeneus faoe, T. byrdi, Xiphopeneus riveti, and Protrachypene precipua, are sold on the local markets. The fishermen and dealers do not make a distinction between the species of this group; all are called brown shrimp. In Puntarenas these shrimp, fresh headless, were retailing for about 30 cents per pound. In San Jose the price ranged between 34 cents and 45 cents per pound. Jumbo white shrimp, fresh headless, were retailing in San Jose for about 60 to 68 cents per pound.

Owing to the precipitous nature of most of Costa Rica's Pacific coast, both nursery grounds for the young and feeding grounds for the adults are limited. There are but three areas that now are commercially productive, the Gulf of Nicoya, Coronado Bay, and the Gulf of Dulce. More than 300,000 pounds, headless weight, of shrimp were produced on these grounds in 1955, whereas probably only about 100,000 pounds were taken in 1954.

15/ The survey of Costa Rica was made during February 1956, and this date, unless otherwise specified, is implied when current events or prices are alluded to.

The upper end of the Gulf of Nicoya, from Puntarenas inland, is reserved as a nursery area, and trawling for shrimp is not permitted there. Along the remainder of the coast, fishing is permitted the entire year. There do not appear to be any definite seasonal tendencies in the catch.

OUTLOOK FOR PRODUCTION

Costa Rica's annual shrimp catch may eventually reach 1 or 2 million pounds, headless weight. Practically all of this can be expected to come from the Pacific coast. The Atlantic side, except perhaps around the mouth of the Colorado River, does not appear to have characteristics suited for shrimp. It seems that all the available Pacific fishing grounds are now being fished to some extent but not to the degree that ultimately should be reached. The date of maximum production may be in the very near future since the number and efficiency of the boats are increasing rapidly.

FISHERMEN AND GEAR

In 1954 there were six or seven small shrimp trawlers operating out of Puntarenas. This number had increased to 21 by the end of 1955 and to 32 by the end of February 1956. It was anticipated that additional, and probably more efficient, boats would soon enter the fishery. As the fishing intensity increases, the less efficient boats will undoubtedly be forced to drop out.

The trawlers usually carry five to six men aboard. All expenses except food are paid for by the boat owner. The custom is to pay the captain and engineer a monthly salary as well as a share of the catch. The captain is generally paid 400 to 500 colones 16/ ($60 to $75) a month and the engineer 200 to 300 colones ($30 to $45). For a five-man crew, and for the lower salary range, the share price is 75 centavos (about 11 cents) per pound of tails. This amount is split so that the captain receives 25 centavos a pound, the engineer 14 centavos and the hands 12 centavos each.

Usually the crew also receives half of the returns from the fish and small shrimp.

The boat owner is paid 2.75 colones (about 42 cents) a pound, headless weight, for large shrimp (20 to the pound and larger) and 1 colon (about 15 cents) a pound for small shrimp. Heading is done aboard.

16/ The conversion rate for the Costa Rican colon was 6.63 to U.S. $1.00. (100 centavos = 1 colon).

Haul-out and repair facilities for boats are relatively good. Haul-out charges are based on keel length. For shrimp trawlers the charge is about 23 cents a foot. Lay days, other than the day of haul-out which is included in haul-out charges, are charged at half the haul-out price.

Diesel fuel is about 17 cents a gallon.

PROCESSING AND MARKETING

Frozen shrimp are flown to Miami, Florida in plane-load lots for 5 cents a pound on the gross weight. Refrigerated ocean freight to the United States is 4 cents a pound.

Foreign-flag vessels may be permitted to fish in Costa Rican waters. Permits must be obtained from the Ministry of Agriculture and Industries.

There is one freezing plant and several small home-type freezing units. Shrimp are frozen in a cold room in the freezing plant. Glazing is accomplished by dipping the carton of frozen shrimp into fresh water.

Some of the plant workers in Puntarenas are paid an hourly wage; others are paid on a piecework basis. Women receive 1 colon (about 15 cents) an hour and men 1.25 colones (about 19 cents).

In Puntarenas, shrimp for outsiders, already packaged, are frozen, glazed, and stored for 1 month for slightly under 3 cents a pound.

FOREIGN TRADE

An export license is required. Licenses are obtained from the Central Bank. Export duties and exchange controls are also applicable to shrimp. Fresh, frozen, or iced shrimp carry a 2-percent ad valorem duty based on the f.o.b. value. Of the dollars received for exported shrimp, 65 percent must be converted at the free-market rate of 6.63 colones to the United States dollar and 35 percent at the official rate of 5.60 colones to the United States dollar. Hence the conversion rate for dollars earned from exporting shrimp is 6.27 colones to the United States dollar.

In the export statistics shrimp are lumped under the general heading of crustaceans and mollusks and are reported in gross kilograms of weight. In 1954 a total of 65,000 pounds of crustaceans and mollusks were exported from Costa Rica. Of this amount, 63,000 pounds were exported to the United States, 1,100 pounds to Curacao, and 900 pounds to Honduras. It is believed that almost all, if not all, of these quantities were shrimp.

There are no restrictions on the importation of shrimp. Import duties, both specific and ad valorem, are applicable. Specific duties are based on gross kilograms of weight and ad valorem on the c.i.f. value. Fresh, iced, or frozen shrimp carry a specific duty of 4 colones per gross kilogram; soups and chowders, 6 colones; other hermetically sealed preparations, 8 colones; and dry, salted, smoked, in brine or simply cooked, 4 colones. The ad valorem duty on all types is 4 percent.

Shrimp imports are not particularly important. In 1954, 19,800 pounds of canned and 28,700 pounds of dried shrimp were imported. Of the canned shrimp, 17,600 pounds were from the United States, and 2,200 pounds were from Norway. Of the dried shrimp, 26,500 pounds were reported as originating in the United States and about 1,100 pounds each from Nicaragua and China (these are gross weights). The c.i.f. value of all shrimp imported during 1954 was $35,000.

ECUADOR [17/]

Along the coast of Ecuador, Guayaquil is the only port with any facilities. The coast in general is arid, and the ports are usually open roadsteads or sheltered bights where cargo is transshipped by lighters. In one place the cargo is carried from the beach to the lighters by men who wade through the shallow surf. Away from Guayaquil, fresh water becomes an important supply problem.

Shrimp-fishing operations started seriously in 1954. There were three companies and about 35 boats fishing shrimp in Ecuador in the fall of 1955. Two shore freezers and one floating plant were in operation. One shore plant was expanding its freezing capacity, and a new plant was to be installed. Operations are conducted under contracts with the government. At present it takes about a year to negotiate such a contract. The contracts permit the use of foreign vessels for 1 year. After that time the vessels must come under Ecuadorean registry.

There are two shrimping grounds: One in the north from about Esmeraldas to the Colombian border, and the other in the Gulf of Guayaquil. The Ecuadorean white-shrimp population can probably provide 3 to 6 million pounds of 20-and-under headless shrimp a year. In 1954, the catch amounted to 1.3 million pounds.

There is a scarcity of experienced shrimp fishermen and plant workers in Ecuador.

17/ The survey of Ecuador was made in late October and early November 1955, and this date is implied when time is not specified with respect to current events and prices.

PACIFIC OCEAN
8-4
Esmeraldas
4-8
Cojimies
Quito
4-8
Caraquez
Manta
Guayaquil
Chanduy
Posorja
Playas
Gulf of
Guayaquil
4-8-12-13
14-15
ECUADOR SHRIMP SPECIES
AND LOCATION
4 Penaeus stylirostris
8 P. occidentalis
12 Xiphopeneus riveti
13 Protrachypene precipua
14 Trachypeneus byrdi
15 T. faoe
60 miles
ECUADOR

COMMERCIAL SPECIES AND FISHING GROUNDS

There appear to be only two species of shrimp, "langostinos," (Penaeus stylirostris and P. occidentalis) taken for export in Ecuador; a third species (P. vannamei) probably is taken, but apparently is not very abundant. The two or three species are not distinguished by either the fishermen or the dealers. They are known locally as blue or blue-pink shrimp but will be referred to here as white shrimp. P. stylirostris and P. occidentalis appeared to be about equally distributed in the catches landed at Guayaquil in late October and early November 1955. The shrimp are large, averaging headless about 20 percent under 10 to the pound, 60 percent 10 to 15 to the pound, and 20 percent 16 to 20 to the pound.

Shrimp smaller than 20 to the pound (headless measure) are rarely taken by the trawlers.

In addition, the boats catch some species of smaller size which are sold locally either whole on ice or peeled and frozen. These smaller species are called "camarones". They include two species of shrimp called "zebra" because of the blue-black stripes on the abdomen (Trachypeneus byrdi and T. faoe), one species of the sea bob (Xiphoneneus riveti) which is brownish and called "titi" by the fishermen, and another species (Protrachypene precipua) which is golden-pink in color and is known locally as "pomada."

These species range from about 35 to more than 100 to the pound, heads-off.

Pink shrimp (probably Penaeus brevirostris) have been reported from the Gulf of Guayaquil near Isla de Muertos in 58 fathoms. A 10-minute haul with about 10-foot try-net brought up about 35 pounds of shrimp that ran 16 to 20 to the pound, heads-off.

There are two fishing areas--one in the Gulf of Guayaquil from Chanduy to the Peruvian border and the other on the northern coast from about Esmeraldas to the Colombian border. There are several other spots along the coast where shrimp appear, but because of the limited area and rocky bottom they are not fished at present. Probably the most important of these are the Cojimies estuaries and the Bay of Caraquez.

The boats rarely fish in depths greater than 15 fathoms. Most of the fishing for white shrimp is between 4 and 10 fathoms. The titi and pomada are taken in shallow waters near shore.

The Ecuadorean Government keeps no records of the amount of shrimp caught. Local consumption is probably about 500,000 pounds annually, headless basis. The 1954 catch is estimated to have been about 1.3 million pounds, headless weight, with a value to the fishermen of about $440,000. About two-thirds of the catch comes from the Gulf of Guayaquil and one-third from near Esmeraldas.

Fishing for shrimp in Ecuador is done throughout the year, as there are no closed seasons or closed areas. From the reports of the fishermen and dealers the fishery appears to be seasonal. In the northern area, near Esmeraldas, the best season is from June to November, and in the Gulf of Guayaquil it is from December to April. The Gulf of Guayaquil is fished the year around. The northern area is fished only during the better season, when a freezing ship and a fleet of trawlers move in from the Gulf of Guayaquil. There are no shore facilities in the north.

OUTLOOK FOR PRODUCTION

The Ecuadorean shrimp catch has excellent prospects of increasing. The better boats now catch around a hundred thousand pounds or more of shrimp, headless weight, a year. The fishing areas for the large white shrimp cannot be increased very much since the only places where these shrimp are likely to occur and are not now fished to any extent are at Cojimies and Caraquez. These two areas are quite limited in size and consequently are not likely to produce any great quantity of these shrimp. The available fishing grounds, nevertheless, can be fished more intensely than now and should produce a greater yield.

The maximum annual production of white shrimp for Ecuador is estimated to be between 3 and 6 million pounds, headless weight. Naturally, as the maximum yield is approached the catch per individual boat will decline and the costs per pound will rise.

There are two areas in the Gulf of Guayaquil that are not now fished but probably could be brought into production provided profitable markets can be found for the shrimp occurring in them. One is the shallow waters where the titi and pomeda abound, and the other is in the deeper waters for the "Panama pinks." Since these areas are not fished now to any extent it is difficult to venture a guess as to their maximum productivity.

FISHERMEN AND GEAR

There are about 200 full-time shrimp fishermen in Ecuador, including captains, engineers, and hands; about half of them are foreigners--mostly Panamanians with a scattering of United States and Portuguese citizens. When the fishery began in 1954 there were no experienced Ecuadorean fishermen, and all technical personnel were foreign. The persons who are developing the Ecuadorean shrimp fishery are mainly United States citizens who had previous experience in Panama. The tendency has been towards increasing the percentage of local fishermen as rapidly as they can be trained. There is no backlog of personnel, however, and the training has to be done with persons who have no background in fishing or in handling boats or motors.

Port clearance, which requires a crew list, is normally demanded for each trip. The captains sometimes cannot round up their registered complement, and at the last minute have to fill in with whomever they can get or delay their departures another day. They are subject to penalty if the crew list is not in agreement with the actual crew aboard.

The crews generally are five men to a boat, a "patron" or captain, an engineer, and three hands. They are paid on the basis of the catch. Payments vary greatly amongst the boat owners. It is general practice, though, for the boat owner to pay for all expenses except food. The payments to the crew vary between s/1.40 (about 8 cents) 18/ per pound of tails plus s/20 (about $1.14) for each trip (the total amount is paid the captain, who pays his crew and the food bill and splits the profits with the crew out of the receipts for the catch) and s/2 (about 11 cents) per pound less the food bill. This seems to average out so that the captain gets s/1 (about 6 cents) per pound of tails, the engineer s/0.40 (about 2 cents) and each hand between s/0.15 and s/0.20 (about eight-tenths of a cent to 1 cent).

On an annual catch of 100,000 pounds of tails this would amount to about $5,700 for the captain, $2,280 for the engineer, and $850 to $1,140 for each hand. This represents gross revenue. The cost of food would have to be deducted before net income could be determined.

18/ The Ecuadorean sucre (written s/) in October 1955 was s/17.55 to s/17.60 to the United States dollar. One sucre was worth about U. S. 5.7 cents.

This accounting, of course, refers only to the better boats. Crew compensation on the average boat probably would run 60 percent to 70 percent of these amounts. On this basis, the fisherman averages somewhat better wages than the shore worker. Prevailing monthly wage scales in Ecuador are: Industrial workers $30 to $35; Government Department heads $114; and Government white collar $35 to $40.

The fishermen do not belong to labor organizations and do not enjoy any fringe benefits. The Ecuadorean law requires that the boat owner must pay damages in case of accident or accidental death. Some owners are covered by insurance while others are not.

Some of the foreign fishermen fish day and night, but the general practice is to fish only during the day. Hauls are generally about 1 hour long.

A few shrimp for local consumption have been taken with cast nets in the estuaries for many years, but it was not until 1951 that modern trawlers were introduced into Ecuador. This first venture, which included two large freezing ships and a fleet of trawlers, failed for various reasons. After that there was a lapse until 1954 before trawling was again resumed.

Currently there are about 35 full-time and no part-time trawlers operating for shrimp in Ecuador. There is one freezer ship in operation.

The trawlers range in size from about 25 to 65 feet overall. The smaller ones comprise about 30 percent of the fleet and have gasoline engines. The larger boats are diesel powered. Five or six of these are converted albacore or tuna boats, and the remainder are United States built, Florida-type trawlers.

About half the boats use refrigerated sea water for preserving the shrimp, one or two use ice and refrigeration, and the remainder carry only ice. The boats using chilled sea water do not have thermal controls, and it is reported that sometimes the shrimp arrive in good condition and at other times they have a decided off-odor. The off-odor shrimp are washed several times before freezing, in order to eliminate the odor.

For most boats that fish for export the trip length is 6 to 8 days. Those fishing out of Manta generally stay out 12 to 14 days since they have about a 20-hour run to and from the fishing grounds. A few boats operating out of Playas for shrimp for local consumption make daily trips. These shrimp are brought to Guayaquil from Playas by truck in a small amount of ice.

About half of the boats are owned by the processors. The ownership of the remainder is about equally divided between fishermen and nonfishermen.

Probably 80 percent of the boats are under foreign registry. More than half are Panamanian, and the remainder are of United States registry. The foreign boats are licensed for 1 year. After this time the boats, unless an extension is granted, must either come under Ecuadorean registry or leave.

The total investment in boats and gear, including the freezer ship, is probably around $800,000. The average boat and gear is worth around $20,000.

The privately owned boats are paid between 36 and 40 cents per pound of tails. This varies with the price of shrimp in the United States and is for run-of-the-mill large and jumbo shrimp. The boats are paid on the basis of pack-out weight with deductions for broken or small shrimp. For peeled shrimp (usually peeled because of black spot) they are paid 62 to 68 cents per pound.

On a production of 100,000 pounds annually, the cost to the boat owner is estimated to be between 20 and 25 cents per pound.

Insurance for total loss, full coverage, runs 5 percent and is reported to be difficult to obtain.

The cost of ice runs from $8 to $10 per ton. Water at Esmeraldas costs only the time and effort it takes to run into the river and pump or dip it aboard.

The only place boats can haul out is in Guayaquil, and here there is capacity only for the trawlers. Larger boats must go to Panama. Haul outs at Guayaquil cost $25 for small boats and $50 for larger boats. The lay time is only the haul-out day. Additional lay days cost $2.50 to $5 each. Boats are normally hauled three or four times a year for cleaning and painting. At Esmeraldas there is a place where the boats can come in at high tide and be worked on at low tide. At Manta they have to be beached.

Diesel fuel costs s/3.70 (about 21 cents) a gallon in Esmeraldas and s/1.20 (about 7 cents) in Guayaquil.

All the boats use Gulf of Mexico design shrimp trawls. Most are flat, but some are balloon. The trawls range from about 40 feet to 120 feet at the mouth; the average is about 90 feet. Most of the trawls are 2-inch mesh with 18-thread in the wings and body and 42-thread in the tail. The usual looped chains are used on the foot rope. Generally 1 net is expended every 2 months. The rig is the usual Florida type, with the main trawl towed from one outrigger and the try net from another on the opposite side of the boat.

PROCESSING AND MARKETING

Shrimp are neither dried nor canned in Ecuador. Processing of shrimp is limited to freezing. The bulk of the catch is frozen headless in 5-pound cartons for export to the United States. For the local market throughout Ecuador the langostinos (large shrimp) are sold whole or headless (on ice or frozen) and the camarones (small shrimp) are sold whole or peeled and frozen or peeled and cooked. The peeled and frozen small shrimp are packed in 2-pound cartons. In 1954 about 800,000 pounds of frozen headless shrimp were produced.

There are two land freezers, one at Manta and the other at Guayaquil, and one floating freezer. The floating freezer operates part of the year in the north and part of the year in the Gulf of Guayaquil. The total daily freezing capacity of these plants is about 33,000 pounds and the storage capacity is about 300 thousand pounds. Investment in these plants is about $250,000. At least 90 percent of the total investment in the Ecuadorean shrimp fishery is United States capital.

Processing cannot be increased very much without additional equipment, which is now being installed in Guayaquil. A shore plant, to operate in conjunction with the freezer ship, will be constructed shortly in Posorja.

There are five ports from which shrimping operations are conducted in Ecuador: Esmeraldas near the Colombian border, Manta about midway between Esmeraldas and the Gulf of Guayaquil, and Playas, Posorja, and Guayaquil on the Gulf of Guayaquil. The bases of operations for export are Esmeraldas, Guayaquil, Posorja, and Manta. Shrimp are landed only at Guayaquil, Manta, and Playas, and at the latter port the amount is small as it is generally only for local consumption within Ecuador.

At Esmeraldas the fishing boats come alongside the freezer boat to discharge. When the freezer has a load she either goes to Manta, Ecuador, or Buenaventura, Colombia, for loading directly aboard the cargo boat. When a haul out is required she has to go to Panama.

At Manta the trawlers transfer their shrimp in boxes to a lighter which is brought in close to shore where a line of men wade through the surf with them to a waiting truck which transports them about 50 yards to the freezing plant. The reverse operation is performed when a shipment of frozen shrimp is made.

At Guayaquil the shrimp, about 50 pounds of shrimp and ice at a time, are unloaded at a pier into a box which has a rope attached at each end. Since the pier is usually higher than deck level, two men, without mechanical aid, use the ropes to haul the box of shrimp onto the pier where it is dumped into another box. This box is then carried on a man's back about 50 feet where it is emptied into the metal washing tank inside the plant. Fresh water is run into the washing tank, and when it is full of shrimp, ice, and water, another tank is used.

The shrimp are dipped from the washing tank onto nearby metal tables where they are sorted and packed. When a washing tank has been emptied, it is drained and rinsed for the next batch.

The packaged shrimp are then frozen. Two plants freeze on open coils and one in a cold room. After the shrimp are frozen in the cartons, the cartons are opened; the glazing water is poured on; the cartons are closed and packed upside down in master cartons, which hold 10 of the 5-pound cartons; and the master carton is strapped and sent to the storage room until time for shipment.

The glazing and washing techniques are the principal important variables in the handling of the shrimp. Guayaquil is the only port where fresh water is readily available. This is the only place where the shrimp are both washed and glazed in fresh water. At Esmeraldas the boats enter the river to take up water for drinking and cooking. The shrimp are washed and glazed with sea water. At Manta the shrimp are washed in sea water and glazed in fresh water. The fresh water is hauled in tank trucks from Montecristi, about 10 miles away. Water costs between s/90 and s/100 for 3 cubic meters ($1.70 - $1.90 per cubic meter). However, pipe is on hand, and it is expected that Manta will have a supply of fresh water before long.

The Government maintains no supervision or inspection of the pack.

Shrimp for export are packed in one-piece 5-pound waxed cartons which cost about $62 per thousand. Dealers estimate that all the material for packing, including cartons, master cartons, and strapping, costs about 2½ cents per pound.

In the retail market at Manta, young P. occidentalis taken at Caraquez with cast nets were selling for s/3 a pound (about 17 cents a pound). They were whole and ran more than a hundred to the pound. In Quito the retail prices of frozen peeled small shrimp were s/12 per pound (about 68 cents) and cooked peeled were s/18 per pound (about $1.02). Large frozen shrimp were retailing for s/12 whole and s/14 headless per pound (about 68 and 80 cents).

There are about 50 full-time and probably more than 100 part-time employees, all male, employed in the processing plants. About 10 of these full-time employees spend less than half of their time on shrimp. The full-time workers average about s/200 (about $11.36) per week. In general they are on a contract basis for 7 days a week with a guaranteed minimum overtime. They get time off when work is slack. The standard work week is 44 hours. The workers are not unionized. The full-time plant workers are under social security. The total assessment is 11 percent of the salary of which the employer pays 6 percent and the employee 5 percent.

FOREIGN TRADE

General

Recently, because of mounting imports, Ecuador has had to take various emergency measures. In September 1955, dried, smoked, and salted fish and anchovies and anchovy paste were placed on the embargo list. Only very small quantities of canned shrimp are imported. No outright prohibition has yet been placed on shrimp imports, probably because the quantity is so small.

Ecuador is primarily agricultural. There is little manufacturing and no heavy industry. In July of 1955 the unfavorable balance of trade had almost reached $10 million, but immediate measures were taken and early in October this deficit had dropped to about $4.5 million.

In 1954, exports and imports totaled around $100 million each. Bananas, cacao, and coffee are the principal exports. Shrimp are becoming increasingly more important as an export item. In 1954 the United States received 65 percent of the total exports and accounted for 53 percent of the imports.

Export taxes

Official export figures on shrimp were not available. Probably about 65 percent of the catch was exported in 1954.

There are no quantitative restrictions on exports except that the national market must be supplied first. 19/ Export permits are required, and export taxes are applicable.

According to the Guayaquil Customs Bureau the only export charges that companies with government contracts have to pay per metric ton (2204.6 pounds) are: s/20 for port charges; s/400 export tax; s/6.52 for dockage taxes; and s/30 in stamps for each permit. The total charges amount to slightly over 1 cent per pound.

The shippers maintain that they have to pay various additional taxes. Their estimates of total export charges run 3 to 4 cents per pound. Among the additional charges which they claim they have to pay are:

a. "Recargo cambiario" (exchange tax). For each net short ton (2,000 pounds) of shrimp exported, exporters have to give the Central Bank $100. This is returned in sucres at the rate of 15.15 to the dollar. (Dollars on the open market cost s/17.60). This tax amounts to s/245 a ton, or about $13.92.

b. A "vigilancia" tax of s/10 per net short ton.

c. A statistical tax of s/1 per net short ton.

d. A one percent tax on freight charges.

e. An "asistencia publica" tax of s/3 per net short ton.

If export shipment is to be made at a port outside of Ecuador (Buenaventura, for instance) at least one, and almost always two, inspectors must be taken along. All of their expenses including salary must be paid by the shipper.

In addition to the export taxes there are certain other fees that must be paid. There is an annual vessel charge per net registered ton of s/25 for boats 5 tons and under, and s/50 per net ton for boats over 5 tons. There is also a nominal anchorage fee for boats not occupying docks.

19/ According to the contracts of the operating companies they are obligated to supply shrimp to the public at prices fixed by the Ministry of Economy. These prices will not be less than cost of manufacture plus transportation charges plus no more than 15 percent profit. Welfare agencies can purchase shrimp at cost plus transportation charges with no profit to the producing companies.

The fishermen's licenses run about s/8 per calendar year per man.

Imports

In recent years Ecuador has imported very little shrimp. The official statistics do not separate imported shrimp from lobsters. For the period 1950 to 1954 the largest quantity imported in any one year was about 6,600 pounds in 1952, and in 1954 only 1 metric ton (2204.6 pounds) was imported.

Apparently canned shrimp only are imported. These imports appear to supply all of the canned-shrimp market, since no shrimp are canned in Ecuador. There are no restrictions on the volume of shrimp imports.

Import duties on shrimp per net kilo (2.2 pounds) are as follows: canned shrimp, s/18 (about $1.02) and frozen shrimp, s/7 (about 40 cents).

In addition canned and frozen shrimp must pay the following fees calculated as a percent of f.o.b. value: consular, 8½ percent; defense, 1 percent; and evaluation commission, 10 percent. Port charges amount to s/105 (about $6.00) per net metric ton and the stamp tax costs s/30 (about $1.70) for each shipment.

Import licenses are required in Ecuador. Imports are classified under two categories, essential and nonessential. Shrimp are classified under the second group. For this classification the importer must make an advance deposit, in dollars, with the Central Bank of 100 percent of the c.i.f. value of the goods. Also, consular fees amounting to 7 percent of the f.o.b. value of the goods and 40 percent of the import duties must be paid in advance. These requisites must be complied with before the import license is granted.

GOVERNMENTAL ASSISTANCE

In Ecuador the fishery resources are considered as belonging to the nation. Fishing operations are conducted on the basis of 10-year contracts with the Federal Government which can be extended provided no changes in the law are enacted prior to expiration. Contracts require the approval of five ministries: Economy, Defense, Foreign Relations, Treasury, and the Presidency. The more recent contracts have required about a year of negotiations, although temporary authorization to operate was granted after 6 or 8 months.

Each contract differs in details, and the tendency has been to make them more restrictive. In general, the contracts provide for the following:

1. A minimum investment.
2. A substantial deposit with the Government to assure compliance with contract.
3. A provision for fines in case of noncompliance.
4. Permission to use foreign vessels for 1 year. These must then come under Ecuadorean registry. The vessels can be used by the Government in case of armed conflict with another nation.
5. The type and number of plants and boats to be erected or used.
6. A time limit within which obligations must be carried out.
7. Exemption from certain export taxes.
8. Specific lists of items by quantities that can be imported free of duty. These are of two types--machinery and equipment for plant or boat installations that are more or less permanent in nature, and materials and supplies that are needed for the continued operation of the business. The first group are allowed a one-time free import. The second group which usually includes cartons, strapping, webbing, nets, etc., are imported free of duty up to certain amounts, specified in the contract, on an annual basis.

   In applying for a contract one must have a pretty good advance idea of what one's requirements will be; otherwise import duties will have to be paid on unforeseen items or on uncalculated amounts. Only those items specified in the contract can be entered free of duty, and only in the amounts specified.
9. A selling price to the public to be fixed by the Ministry of Economy that will provide a maximum profit of 15 percent.
10. Exemption from income tax on capital used for importing machinery, equipment, and supplies and for expansion and development of the business.
11. The company paying the Government a certain percentage of the net profits of the business, during the period that certain taxes have not been imposed or increased. 20/
12. The percentage of foreign technical personnel that can be employed while no nationals are available.

Ecuador, like many countries with limited industries, to a great extent uses import and export taxes to finance the Government. Considerable concessions, contained in the contracts, have been granted the shrimp industry on import taxes and to a lesser extent on export taxes. No other assistance has been provided.

20/ The percentages vary. One contract, published in 1955, calls for ½ of one percent for the first five years and 1 percent for the remaining time. Another contract, published only 1 month later, requires twice the amount, or 1 percent and 2 percent.

Rio Lempa
San Salvador
Río Lempa
La Union
Gulf of Fonseca
PACIFIC OCEAN
4-5-8-12-14-15
EL SALVADOR SHRIMP SPECIES AND LOCATIONS
4 Penaeus stylirostris
5 P. vannamei
8 P. occidentalis
12 Xiphopeneus riveti
14 Trachypeneus byrdi
15 T. faoe
25 miles

EL SALVADOR

EL SALVADOR [21/]

El Salvador produces about 300,000 pounds of shrimp, heads-on weight, a year. Almost all of this amount is consumed within the country. The available supply of shrimp can probably sustain an annual production of one to three million pounds, heads-on. The trawling grounds extend from the Gulf of Fonseca to a little west of the mouth of the Lempa River. Only boats of Salvadoran registry can fish for shrimp. To operate in El Salvador, fishing companies must be at least 50 percent Salvadoran-owned. Six trawlers are operating in El Salvador catching both shrimp and fish for local markets. Shore facilities are poor, but improving. Trawlers go to Puntarenas, Costa Rica, for haul-outs. There are import, but no export, duties on shrimp.

COMMERCIAL SPECIES AND FISHING GROUNDS

The shrimp-trawling grounds of El Salvador extend along the coast from about the mouth of the Lempa River eastward into the Gulf of Fonseca. In this area large shrimp, mostly Penaeus stylirostris with some P. occidentalis and P. vannamei, are taken. About 50 percent of the trawl catch of these species average under 15 to the pound, headless. The trawlers also take Trachypeneus byrdi, T. faoe, and Xiphopeneus riveti, which are species of smaller size. The best trawling season is from November to June in depths of less than 10 fathoms.

The young of several of these species are caught in some of the lagoons, principally near the Lempa mouth, and in the Gulf of Fonseca. Cast nets and dugout canoes are used for catching the young shrimp. The best fishing in the lagoons is during the rainy season from June to November. In one lagoon near the mouth of the Lempa small shrimp are caught during the rainy season and corn is frequently grown during the dry season.

All small shrimp, irrespective of species, are called "chacalin," and all large shrimp are given the common name "camaron."

21/ The survey of El Salvador was made during February 1956, and this date is implied when current events or prices are alluded to.

It is estimated that the 1955 catch was about 300,000 pounds, heads-on weight. Most of this amount was sold within El Salvador, although some shrimp were exported fresh-iced to Honduras and frozen to Guatemala. Most of the lagoon-caught small shrimp are marketed cooked-whole and salted. The large shrimp are usually marketed fresh, both whole and headless, and a few in the frozen state. In San Miguel jumbo headless shrimp were retailing in the market for 60 cents a pound.

Figure 8.--Women cast netting for shrimp at La Union, El Salvador.

OUTLOOK FOR PRODUCTION

Fishing grounds off El Salvador probably can eventually yield between 1 and 3 million pounds of shrimp, heads-on weight, a year. Any immediate sizable increase in catch would have to be for export, since the local markets would not be able to expand rapidly enough to absorb a greatly increased supply. Eventually local demand should absorb the

entire amount of shrimp that El Salvador can produce. The major deterrents to immediate expansion are the lack of shore facilities and the problems connected with the issuance of licenses. The currently operating boats are fishing with temporary permits; it was reported that additional boats were awaiting permission to operate.

FISHERMEN AND GEAR

Six trawlers from about 36 to 80 feet long were operating in El Salvador for both fish and shrimp. None fished exclusively for shrimp. Many small fishes, not marketable in some other countries, find a ready market in El Salvador.

The larger boats use a semiballoon trawl, 75 feet at the mouth. One of the trawlers uses 7-foot 6-inch by 42-inch doors and 16-foot door legs; the trawl is $2\frac{1}{4}$-inch stretched mesh throughout with 18-thread twine in the wings and body and 54-thread in the cod end.

Shore and dockage facilities are not good. In La Union the boats can approach the dock only at high tide. This, of course, limits loading and unloading time unless lighters are used. There are no marine ways or drydock, so the boats go to Puntarenas, Costa Rica, for haul-outs. There are no large shore freezing facilities in the area. Ice-making capacity in La Union is very limited. It was reported that an additional small ice plant was to be constructed in La Union which would bring the total ice-making capacity for this port to about 6 tons daily. Ice was retailing for $20 to $24 a ton in La Union and for about $10 to $13 a ton in San Salvador.

The trawlers carry from 4 to 12 men aboard. There are about 50 fishermen operating the trawlers. The fishermen work for wages and do not share in the catch. Their provisions, which are chiefly rice, beans, and tortillas, are furnished by the boat owner. The monthly wages of the hands run from 90 to 130 colones 22/ ($36 to $52). This is somewhat better than unskilled labor ashore is paid. Outside San Salvador the daily wage of an unskilled laborer is from 1 to 1.50 colones a day.

On one boat the captain and the first and second engineer are paid monthly salaries that amount to $400 for a captain and $160 and $120 for an engineer. Trained personnel is scarce.

22/ One colon is equivalent to United States 40 cents.

FOREIGN TRADE

El Salvador import and export statistics do not list shrimp as a separate item. The amount of shrimp imported is relatively unimportant. Exports are estimated to be 600 to 800 pounds of whole fresh shrimp a month to Honduras and a like amount of frozen headless to Guatemala.

There are no export duties on fishery products, but one, and sometimes two, types of specific import duties apply. All shrimp are subject to a general import duty and those packed in vinegar are also subject to a preferential duty. The duties are based on 220 pounds, gross weight. For fresh, frozen, or dried shrimp the general duty is $35. For shrimp pastes and for shrimp canned in oil, sauce, or brine the duty is $51.40. Pickled shrimp carry a general duty of $51.40 and a preferential duty of $29.29 for freight shipments and $42.26 for parcel-post shipments.

GOVERNMENTAL ASSISTANCE

The Government of El Salvador has been encouraging the development of the fishing industry by several means. A cooperative fishing colony comprising 25 families has been started near La Union. The government, among other things, provides housing, lights, and teachers.

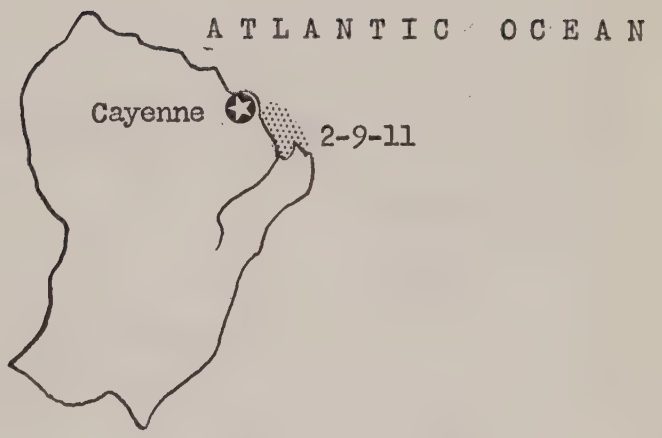
The policy of encouraging industry also applies to fish canneries and other fish-processing plants. For stipulated periods such companies are given exemptions from import duties on certain materials and supplies and exemption or reduction on certain taxes. 23/ At least 50 percent of the capital of the companies must be native. Fishing within 12 miles of the coast is reserved for boats of Salvadoran registry belonging to Salvadorans or to companies that are at least 50 percent Salvadoran-owned.

23/ Legislative Decree 661 of May 22, 1952. Published in Diario Oficial 102; Vol. 155; May 30, 1952; and Article 19 of the Fishery Law, Decree No. 1961.

FRENCH GUIANA

French Guiana was not visited during the course of this survey. Reports indicate that the shrimp species and abundance are quite comparable to those of neighboring Surinam. The sea bob, Xiphopeneus kroyeri, predominates, and the brown and the white shrimp, Penaeus aztecus and P. schmitti, are present but apparently not abundant.

It is estimated that eventual production should be about the same as that for Surinam --perhaps 5 to 6 million pounds, heads-on, a year.



FRENCH GUIANA

RENCH GUIANA SHRIMP SPECIES AND LOCATIONS

2 Penaeus aztecus

9 P. schmitti

11 Xiphopeneus kroyeri

150 miles

Gulf of Honduras
9
3
Lake
Izabel
Guatemala City
Champerico
San Jose
4
PACIFIC OCEAN
100 miles
GUATEMALA
GUATEMALA SHRIMP SPECIES
AND LOCATIONS
3 Penaeus duorarum
4 P. stylirostris
9 P. schmitti

GUATEMALA 24/

About 50 thousand pounds, heads-on weight, of shrimp are caught annually by part-time fishermen using cast nets. There is no trawl fishery for shrimp in Guatemala. An estimated 1 to 2 million pounds, heads-on, can probably be produced along the west coast, where there are no harbors and port facilities are poor. Prospects on the east coast are not good.

COMMERCIAL SPECIES AND FISHING GROUNDS

Guatemala has no regular shrimp fishery. It is estimated that about 50,000 pounds, heads-on weight, are caught with cast nets each year. These appear to be entirely the white or blue shrimp, Penaeus stylirostris, which are taken in some of the estuaries of the west coast near San Jose. Some white shrimp, probably P. schmitti, are reportedly taken on occasion from Lake Izabal on the east coast.

The possibility of developing a shrimp fishery on the west coast is greater than on the east coast. There are more nursery grounds and adult feeding grounds on the west than on the east coast. Reports are numerous of Mexican trawlers fishing along the west coast of Guatemala.

OUTLOOK FOR PRODUCTION

Interest is being shown, both in the United States and in Mexico, towards initiating a Guatemala-based shrimp fishery on the west coast in connection with Guatemalan capital. The major drawback lies in the lack of harbor and port facilities. There are no harbors suitable for sheltering boats. Unloading facilities consist of two piers, one at San Jose and the other at Champerico, extending to sea beyond the surf line.

It is estimated that maximum annual production on the west coast would probably be between 1 and 2 million pounds of shrimp, heads-on weight.

Reports from the east coast suggest that the shrimp in this region are dispersed during most of the time and congregate only now and then.

24/ The survey of Guatemala was made during February 1956, and this date is implied when current events or prices are alluded to.

PROCESSING AND MARKETING

Fresh shrimp are scarce and expensive in Guatemala. Juvenile blue shrimp from near San Jose were selling in Guatemala City for 80 cents 25/ a pound for whole shrimp running about 36 to 50 to the pound. Semidried shrimp from Mexico were retailing for 60 cents a pound. In San Jose very small fresh shrimp, of more than 100 to the pound, whole, were selling for 25 cents a pound.

FOREIGN TRADE

Shrimp are not exported from Guatemala. Shrimp imports are principally semidried from Mexico, canned from the United States, and frozen from the United States and El Salvador. The quantities of these imports are not large, nor are shrimp shown separately in the import statistics. In 1954 the value of imports were as follows: fresh and frozen fishes, crustaceans, and mollusks, $28,000; dried, salted, brined, or smoked fishes, crustaceans, and mollusks, $40,000; canned crustaceans and mollusks, $35,000.

There are no export duties on fishery products, but there are specific duties on fishery imports. The duties are based on gross weight and amount to about 7 cents a pound for canned fishery products, about 4½ cents a pound for brined, salted, dried, or smoked, and about 1½ cents for fresh or frozen.

25/ The Guatemalan rates are the equivalent of United States currency.

HONDURAS 26/

Honduras has no commercial shrimp fishery. Probably about 50,000 pounds, heads-on weight, are caught annually in the Gulf of Fonseca. The Caribbean coast perhaps can eventually product 500,000 pounds, heads-on, a year but the reportedly scattered distribution of the shrimp is not conducive to fishing. Imports of shrimp are insignificant.

COMMERCIAL SPECIES AND FISHING GROUNDS

There is no commercial fishing for shrimp in Honduras. The only consistent fishing is that by the natives, principally for their own use, with cast nets along the shores of the Gulf of Fonseca. In this area, juveniles of Penaeus stylirostris and P. occidentalis are caught. Probably about 50,000 pounds, heads-on weight, of shrimp a year are caught in the Gulf of Fonseca. The portion of this gulf pertaining to Honduras is limited, and there is not much possibility that a commercial fishery, other than for local consumption, will develop there.

Various trawlers have fished the Caribbean shores of Honduras and have caught some white (probably P. schmitti though perhaps the species is P. setiferus) and pink (P. duorarum) shrimp. From reports of these operations it appears that the best area is between Cape Camaron and Cape Gracias a Dios, and that the pink are probably more abundant than the white. The shrimp seem to be scattered and not in great concentration. Reports of trawling in Lake Caratasca indicate that this lake is not a nursery area. Probably the sand and coral nature of the adjacent seabed is not suited for the adult white shrimp.

The lagoons between Puerto Cortes and La Ceiba apparently do not serve as nursery grounds either. Local inhabitants claim that no shrimp can be found in these lagoons. Everywhere else in Latin America where shrimp occur, the local population is catching and eating them; it can be concluded, consequently, that if shrimp are in this area, they are too few in number to sustain a commercial fishery.

26/ The survey of Honduras was made during February 1956, and that date is implied when current events or prices are alluded to.

CARIBBEAN SEA
Cape Camaron
3
Puerto Cortes
La Ceiba
Trujillo
9
Lake
Caratasca
Cape Gracias
a Dios
Tegucigalpa
Gulf of
Fonseca
4-8
50 miles
HONDURAS SHRIMP SPECIES
AND LOCATIONS
3 Penaeus duorarum
4 P. stylirostris
8 P. occidentalis
9 P. schmitti
HONDURAS

Reports of the scattered distribution of the pink shrimp indicate that this species is probably not abundant along the eastern shores of the Caribbean coast of Honduras. Because of its distance from shelter, the area is not too promising. It is estimated that 500,000 pounds, heads-on weight, may eventually be produced in Honduras.

FOREIGN TRADE

About 600 to 800 pounds of fresh shrimp a month are imported by truck from El Salvador. This shrimp retails in Tegucigalpa between $1.10 and $1.25 per pound. 27/ Small amounts of frozen and canned shrimp are imported from the United States. In 1954 these imports amounted to less than $1,000 of frozen, and about $6,300 of canned shrimp.

Import duties are about 23 cents a gross pound on fresh, frozen, and dried shrimp and about 45 cents a gross pound on canned shrimp. Fishery product from El Salvador enter duty-free.

There are no export duties on fishery products.

27/ Conversion rate is 2 lampara = United States $1.00.

MEXICO SHRIMP SPECIES
AND LOCATIONS
1 Penaeus setiferus - to about 18 fathoms
2 P. aztecus - to about 35 fathoms
3 P. duorarum - 14 to 25 fathoms
4 P. stylirostris - to about 15 fathoms
5 P. vannamei - to about 15 fathoms
6 P. californiensis - 15 to 30 fathoms
7 P. brevirostris - 20 to 45 fathoms
Rio Colorado
Puerto Penasco
Guaymas
Santa Rosalia
Topolobampo
Magdalena Bay
Mazatlan
Escuinapa
San Blas
Soto la Marina
Tampico
Tamiahua Lagoon
Gulf of Mexico
Mexico D.F.
Veracruz
Bay of Campeche
Campeche
Champoton
Ciudad del Carmen
Acapulco
Salina Cruz
PACIFIC OCEAN
MEXICO
300 miles
4-6
4-5
6-7
1-2
3
1

MEXICO

The total Mexican shrimp catch averaged about 80 million pounds annually (1950-1954), heads-on basis of which about 75 percent was exported frozen to the United States. About two-thirds of the Mexican shrimp production comes from the west coast and one-third from the east coast.

The Mexican shrimp fishery appears to have reached the stage where productive ability no longer depends on fishing or plant capacity. Production depends more on the biological potential of the species of shrimp and the capacity of the market to absorb smaller-sized shrimp. In the Gulf of California there seems to be a large supply of small pink shrimp (40 and over to the pound) in deeper waters than are now being fished. 28/

In Mexico there are about 38 freezing plants, 7 canneries, 9 freezing boats, 4 transport boats, and 750 trawlers involved in the shrimp fishery. 29/ These represent a total investment of about $22 million, of which about 12 percent is United States capital.

There are about 4,600 regular fishermen, and about 6,600 fishing seasonally. Fishing is restricted to local fishermen belonging to officially recognized cooperatives.

Shrimp freezing-capacity is over 300 tons daily.

28/ There was an unusual and heavy run of brown shrimp in the Gulf of California during the fall and winter of 1955-56. Between September 1 and December 31 of 1955, Guaymas exports of frozen shrimp, for instance, were more than twice the level for the same period in 1954.

29/ During 1955 at least 7 freezing plants, 2 canneries, and 3 freezing ships did not operate. Most of these were on the west coast.

West coast

Shrimp fishing, by primitive means, on both coasts of Mexico goes back to preconquest times. The modern fishery on the west coast started about 1930 when a United States concern began fishing with shrimp trawls out of Guaymas and Topolobampo. Most of the catch was iced and shipped by rail to Nogales, Arizona. Some, however, was frozen aboard a freezer ship.

Several Japanese companies entered this fishery in 1934 with large freezer ships and fleets of modern trawlers. In addition to fishing shrimp for consumption in the United States and in Japan they did a great deal of exploratory fishing along the west coast of Mexico and along the Caribbean and Gulf of Mexico coasts as well.

Figure 9.--A primitive salt works on the west coast of Mexico near Escuinapa. During the rainy season this same area is inundated and provides an excellent nursery area for shrimp.

The Mexican Government in 1939 prohibited the operation of foreign boats. The present-day fishery dates from this time. Two Mexican-owned freezing plants began operating in 1941, one at Topolobampo, and the other at Guaymas. For several years these plants operated without competition. With the termination of World War II and the boom in the shrimp market, freezing plants began to spring up all along the west coast. In 1955 there were 27 shrimp-freezing plants, 7 canneries, 9 freezing boats, and about 500 trawlers from Santa Rosalia to Salina Cruz. 30/

When only Guaymas and Topolobampo had freezing plants, the fishing fleet covered the area between the mouth of the Colorado River and Altata. Later, when a plant was established in Mazatlan, the marine fishing grounds expanded to San Blas. Shortly thereafter, the extreme southern grounds, extending from Salina Cruz to the Guatemalan border, were invaded by the Guaymas and Mazatlan fleets. Finally, in the early summer of 1952 these fleets extended their operations to the west coast of Baja California.

Shrimp are landed at many places along the west coast, but the five principal ports are Guaymas, Mazatlan, Topolobampo, Salina Cruz, and Puerto Penasco. Guaymas and Mazatlan are about of equal importance and between them account for about 50 percent of the west-coast landings. About 10 percent of the west-coast catch is landed at Topolobampo, and about 7 percent each at Salina Cruz and Puerto Penasco.

East coast

The catching of shrimp in various estuaries along the east coast of Mexico, like the west coast, occurred before the Conquest. Padre Antonio Vazquez de Espinosa, in about 1620, mentioned the prosperous shrimp fisheries of Laguna Tamiahua. This same lagoon still produces large quantities of small shrimp each year. The modern east-coast fishery, like that of the west coast, is of recent origin. In the mid-1930's two Japanese trawlers explored the entire coast between British Honduras and the United States border, but it was not until 1945 that trawling really became established. In that year various United States fishing boats "rediscovered" the shrimp off Ciudad del Carmen and the rush was on. In a relatively short time the entire east coast of Mexico was explored by United States boats, and forces were combined with Mexican citizens for the purpose of obtaining fishing and landing privileges. It was not long before local Mexican capital became interested in the purchase and construction of boats and freezing plants, and Ciudad del Carmen became a thriving shrimp port. It is now Mexico's

30/ Since the peak production of 1950-51 some of the west coast operations have failed, and in 1955, 7 plants, 2 canneries, and 3 freezing boats were not operating.

largest shrimp port, and more shrimp are landed there than in any other Mexican port.

Directly connected with the shrimp industry on the east coast of Mexico are 11 freezing plants (9 in Carmen, 1 in Lerma, and 1 in Tampico, 31/), 4 transport boats carrying frozen shrimp to the United States, 2 freezing ships (not operating), and about 250 trawlers.

Ciudad del Carmen, Campeche, and Tampico are the three important shrimp-trawling ports on the east coast of Mexico. Tamiahua produces the greatest amount of estuarine shrimp. About 85 percent of the east-coast trawl catch is landed at Ciudad del Carmen, and about 8 percent at Campeche. Practically all the rest (about 7 percent) goes to Tampico.

Mexican shrimp trawlers operate between Soto la Marina and Campeche.

CATCH

Official Mexican catch records are not particularly good, as shrimp are reported and classified into but three categories--fresh, dry with shell, and dry peeled. The fresh category includes fresh whole, fresh headless, fresh headless and frozen, whole cooked, and cooked peeled. The vast bulk of the catch classed as fresh is actually frozen headless.

Table 10 shows the converted catches by type of product.

The figures in the last column of table 10 can be considered estimates of the annual catches of whole shrimp as they come from the water. According to these figures the greatest rate of increase in the Mexican shrimp catch occurred between 1944 and 1948. Since 1951 the catch has been decreasing. Mexico caught over 8 million pounds more shrimp in 1951 than in 1954.

31/ The Tampico freezing plant was destroyed by the September 1955 storms but is being rebuilt. The original plant went into operation in August 1954. There are also 2 freezing plants, one government-owned, in Veracruz that freeze shrimp on occasions.

TABLE 10.--SHRIMP PRODUCTION IN MEXICO, BY YEARS, 1940-54

(Converted to raw shrimp, heads-on basis, in thousands of pounds)

Year	Fresh	Dry, with shell	Dry peeled	Total
1940	14,001	8,109	1,175	23,285
1941	6,288	8,598	3,234	18,120
1942	10,710	8,161	1,898	20,769
1943	11,808	8,955	1,691	22,454
1944	12,132	11,018	902	24,052
1945	21,962	9,154	838	31,954
1946	32,619	10,443	355	43,417
1947	39,010	8,433	370	47,813
1948	63,230	10,721	1,094	75,045
1949	64,161	6,925	403	71,489
1950	69,919	8,776	869	79,564
1951	76,885	9,054	1,142	87,081
1952	58,351	11,197	12,474	82,022
1953	68,490	6,270	1,931	76,691
1954	68,105	10,046	708	78,859

Conversion factors:
Fresh headed x 1.67
Dry,with shell x 3.00
Dry peeled x 7.30

1 metric ton = 2204.6 pounds

When the catches are separated into those coming from the east coast and those from the west coast, it immediately becomes apparent (figure 10 and tables 11 and 12) that the west-coast shrimp production has declined since 1950 while the east-coast catch has remained fairly constant since 1951.

MEXICAN SHRIMP PRODUCTION

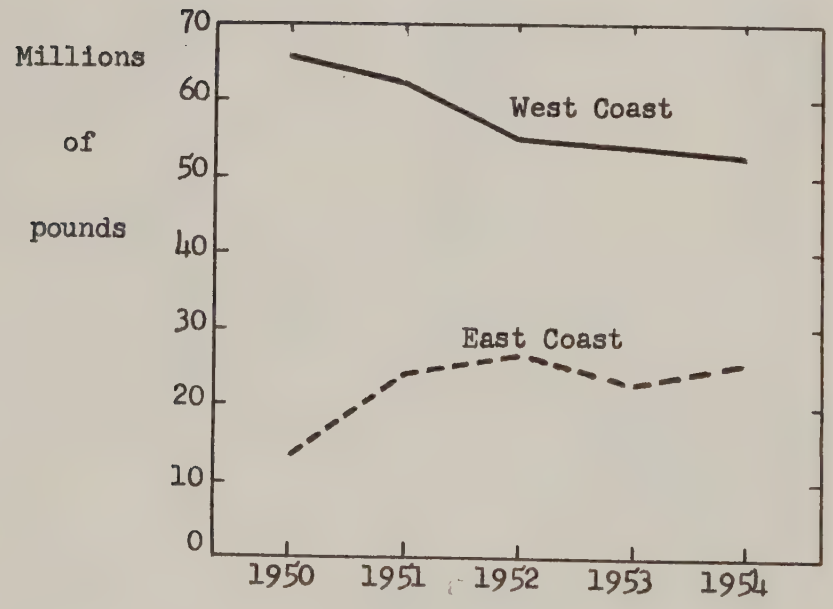


Figure 10

TABLE 11.--MEXICAN EAST COAST SHRIMP PRODUCTION, BY YEARS, 1950-54

(Converted to thousands of pounds, heads-on basis)

Year	Fresh	Dry, with shell	Dry peeled	Total catch heads-on
1950	10,847	1,991	516	13,354
1951	20,721	2,275	999	23,995
1952	16,250	2,553	8,047	26,850
1953	19,628	2,454	708	22,790
1954	22,608	2,619	564	25,791

Conversion factors:
Fresh headless x 1.67 = Whole fresh shrimp
Dry, with shell x 3.00 = Whole fresh shrimp
Dry peeled x 7.30 = Whole fresh shrimp

TABLE 12.--MEXICAN WEST COAST SHRIMP PRODUCTION, BY YEARS, 1950-54

(Converted to thousands of pounds, heads-on basis)

Year	Fresh	Dry, with shell	Dry peeled	Total catch heads-on
1950	59,072	6,785	353	66,210
1951	56,164	6,779	143	63,086
1952	42,101	8,644	4,427	55,173
1953	48,862	3,816	1,223	53,901
1954	45,497	7,427	146	53,070

Conversion factors:
Fresh headless x 1.67 = Whole fresh shrimp
Dry, with shell x 3.00 = Whole fresh shrimp
Dry peeled x 7.30 = Whole fresh shrimp

The west-coast catch declined by more than 13 million pounds, or about 20 percent, from 1950 to 1954. The striking thing about this drop in catch is that it occurred in spite of increased fishing effort, extension of the fishing grounds, increased fishing depths, and increased catches of less desirable species (brown and red shrimp). 32/

About 85 percent of the total shrimp catch of Mexico is reported as fresh-headless. About one-third of the fresh-headless comes from the east coast, and two-thirds from the west coast (table 13).

TABLE 13.--PERCENTAGE OF TOTAL CATCH FROM EAST AND WEST COASTS OF MEXICO, BY YEARS, 1950-54

Year	East-coast percentage	West-coast percentage
1950	16.8	83.2
1951	27.6	72.4
1952	32.7	67.3
1953	29.7	70.3
1954	32.7	67.3

The great expansion of the Mexican shrimp industry has been stimulated by the increased exports of fresh and frozen shrimp to the United States.

Since 1941 United States imports of fresh and frozen shrimp have accounted for an increasingly greater percentage of the Mexican total catch of shrimp.

In 1941, the United States imported less than 30 percent of the Mexican catch, whereas during the 5-year period ending in 1954, the United States imported more than 75 percent of the total Mexican shrimp production.

32/ The 1955 catch from the west coast was appreciably greater than in 1954. This was caused by an unusual abundance of brown shrimp in the Gulf of California.

Official Mexican statistics on the value of the shrimp catch (table 14) are inaccurate at times. They are based on the valuation given by the local fishery inspectors, who occasionally make serious errors. The 1952 valuation of fresh shrimp obviously is extremely low.

TABLE 14.--VALUE OF MEXICAN SHRIMP CATCH, BY YEARS, 1950-54

(Converted to thousands of United States dollars. Valuations given by the local inspectors of the Direccion General de Pesca Industries Conexas. Average value of peso = 11.6 cents, from 1950-52; 11.7 cents in 1954; and 9.1 cents in 1954.)

Year	Fresh	Dry, with shell	Dry peeled	Total
1950	5,943	448	28	6,419
1951	6,832	530	25	7,387
1952	3,097	505	91	3,693
1953	12,073	496	43	12,612
1954	8,487	913	22	9,422

COMMERCIAL SPECIES AND FISHING GROUNDS

Mexican commercial marine shrimp, "camarones," all belong to the family Penaeidae. The more important species belong to one genus, Penaeus. Although the commercial names may be the same (white, brown, pink), the species on either side of the continent are quite distinct.

West coast

On the west coast of Mexico, the four species of shrimp caught commercially 33/ are the blue "azul," Penaeus stylirostris, the white "blanco," P. vannamei, the brown "cafe," P. californiensis, and the pink or red "rojo," "rosado," or "piojillo," P. brevirostris. Because of variations in color, confusion of names among fishermen and dealers is common. The blue shrimp occasionally is white in color, particularly near the mouth of the Colorado River. The white shrimp is sometimes bluish or brownish, and the brown and pink shrimp are at times difficult to distinguish by color alone. Brown and red shrimp are "grooved," that is the grooves that appear on either side of the headspine (rostrum) continue back almost to the end of the head (carapace). In the blue and

33/ Various other species such as Xiphopeneus kroyeri var. riveti, Trachypeneus faoe, and several species of Sicyonia are taken but they are of no commercial significance.

white shrimp these grooves end considerably farther forward, near the beginning of the rostrum.

The blue and white shrimp are rarely caught in depths greater than 15 fathoms. The brown is taken mostly between the 15- and 30-fathom contours but occasionally is found in shallower and deeper waters. The red shrimp is seldom caught in less than 20 fathoms and is taken in depths to 45 fathoms, which is the limit of operations of the shrimp fleet.

The blue and brown shrimp are found everywhere on the west-coast fishing grounds. The white and red shrimp are not taken along the west coast of Baja California. The blue shrimp is the most abundant species at Salina Cruz, and in all of the fishery north of Mazatlan. The white shrimp is most abundant between Mazatlan and San Blas.

The market preference is for the blue and white shrimp. As the season progresses and as these two species become scarcer, the boats fish first for brown and later for red shrimp. The blue and white shrimp are caught during the daytime and the brown and red at night. Generally, about 75 percent of the trawl catch of blue and white shrimp runs under 20 to the pound, heads-off. The brown shrimp usually are smaller than 21-25 to the pound, heads-off, and the red 31-35 or smaller.

The only area where relatively accurate records of the catch of the various species of shrimp are available is that covered by the Mazatlan trawl fleet. Estimates of the percentage of catch by weight of shrimp made by the biologist studying this fishery are as follows:

	October 1953 to May 1954	October 1954 to May 1955
Northern zone: (between mouth of Sinaloa River and Mazatlan)	Percent	Percent
Blue shrimp	38	39
White shrimp	23	23
Brown shrimp	28	32
Red shrimp	11	6
Southern zone: (between Mazatlan and San Blas)		
Blue shrimp	9	5
White shrimp	80	66
Brown shrimp	11	28
Red shrimp	(insignificant)	(less than 1)

	October 1953 to May 1954	October 1954 to May 1955
	Percent	Percent
West coast of Baja California		
Blue shrimp	28	(insignificant)
White shrimp	None	None
Brown shrimp	72	100
Red shrimp	None	None
Relative production of zones:		
Northern	87	72
Southern	11	27
Baja California	2	(less than 1)

The preponderance of the catch of the Guaymas fleet is blue shrimp.

East coast

On the east coast of Mexico three species of shrimp are important commercially, the white "blanco," Penaeus setiferus, the brown "cafe" or "moreno," P. aztecus, and the pink "rosado," P. duorarum. The common names describe fairly well the color of the shrimp, and there is not as much confusion in distinguishing the species by color as on the west coast. 34/

Figure 11.--Shrimp boats in port at Ciudad del Carmen, Mexico.

34/ Xiphopeneus kroyeri is also taken at times near Ciudad del Carmen, but is not of commercial significance.

The brown and pink shrimp, like the brown and red shrimp from the west coast, are grooved shrimp.

The white shrimp is usually taken during daylight in the vicinity of Ciudad del Carmen in depths of less than 15 fathoms. The brown shrimp is most abundant off the northeast coast from Veracruz northward and in the area immediately west of Carmen. It is caught at night in depths as great as 40 or 45 fathoms. Most of the catches are made in lesser depths. The pink shrimp is also caught at night in depths generally between 15 and 25 fathoms. The center of the pink-shrimp fishery lies in a triangle between Arcas Keys, Campeche and Champoton. The Mexican trawlers rarely fish north of Arcas Keys or Campeche.

A representative sample of over 500,000 pounds of shrimp landed at Ciudad del Carmen throughout the year 1954 contained 37 percent white shrimp and 63 percent brown and pink shrimp combined. The white and brown shrimp run larger than the pink. Over 62 percent of the white and about 66 percent of the brown were 26-30 to the pound (heads-off) or larger. Less than 33 percent of the pink were of comparable size. The size distribution for each species and for all species combined is shown in table 15.

TABLE 15.--DISTRIBUTION BY SPECIES AND SIZE OF SHRIMP LANDED AT CIUDAD DEL CARMEN, MEXICO, AS PERCENT OF TOTAL CATCH, 1954

(Size designated by number to pound, heads-off basis)

Number	White	Brown	Pink	All species
15-20	20.1	33.2	3.3	11.7
21-25	25.6	18.4	10.3	16.5
26-30	16.5	14.0	19.1	17.8
31-35	9.9	10.3	15.2	12.8
36-42	9.9	10.8	19.8	15.5
43-50	3.6	3.7	8.4	6.3
51-65	14.4	9.6	23.9	19.4
Total	100.0	100.0	100.0	100.0

On the east coast of Mexico, trawl fishing is permitted at sea throughout the year. During much of the period between October and April the weather serves as a deterrent to fishing. Throughout the fall and winter a succession of strong winds sweeping from the north across the Gulf of Mexico keeps the boats in port many days. Fishing with trawls is not permitted in estuarine waters anywhere in Mexico, but this restriction is not always observed.

On the west coast of Mexico, trawling at sea for the past several years has been permitted from October 1 to July 31. The closed August-September season did not apply to the fishery between Salina Cruz and the Guatemalan border. In this region fishing was, and is, permitted the year round.

Inasmuch as the fishing seasons are determined by administrative action, they are changed frequently. In August 1955, the closed season for trawling at sea along the coasts of Baja California, Sonora and Nayarit was changed from August-September to March 16 - April 15, with a possible extension of the closed season until May 15, depending upon the spawning intensity of the shrimp. At the same time a modification was made in the fishing rules which permitted, as an experiment, estuarine fishing to begin on August 15 in southern Sonora, provided 80 percent of the shrimp were 12.5 cm. (5 inches) or more in total length. Normally, shrimp fishing is permitted in the estuarine waters in the States of Baja, California, Sonora, Sinaloa, and Nayarit between September 1 and April 15.

OUTLOOK FOR PRODUCTION

It is unlikely that Mexico's shrimp production will increase greatly unless the demand for medium and small red and brown shrimp increases or unless management principles, not now known or practiced, are introduced, or unless environmental changes cause an increase in the shrimp population. 35/

United States imports of fresh and frozen shrimp from Mexico rose from slightly over 3 million pounds in 1941 to almost 40 million pounds in 1950. From 1941 to 1943 and from 1944 to 1950 imports tended to increase by about 38 percent a year, but since then the imports have fluctuated but the trend has been downward. (table 30)

35/ During the 1955-56 season there was a large run of brown shrimp in the Gulf of California and United States imports were greater than during the immediately preceding years.

The downward trend in exports of frozen and fresh shrimp, since 1950, is probably of considerable biological significance. It is caused by a decrease in production from Mexico's west coast. It has occurred in spite of expansion of fishing grounds and increase in catches of less desirable species. Particularly significant is the decline in the catch of the highly prized blue shrimp of the west coast, which has been considerably greater than the decline shown in the total catch figures. Total shrimp production has been maintained by increasingly greater catches of brown and red shrimp which have partially compensated for the decline in blue shrimp.

If the decline in blue shrimp is the result of over-fishing, this could be rectified by proper management, but sound management principles have not as yet been applied to the shrimp fisheries. If the decline is the result of natural fluctuation, unrelated to the acts of man, the catch of blue shrimp could return to its peak at any time.

There is always the possibility that restrictions will be placed on the weir "tapo" fishing of young white shrimp in the estuaries of southern Sinaloa and Nayarit States. Restrictions on weir fishing would tend to increase production of frozen shrimp. The small shrimp taken in the weirs are destined for local consumption in either the canned or dried state; it is not likely, therefore, that all of the weirs would be removed. It is also impossible to guess how much of an increase in the catch of shrimp, suitable for freezing, would result from elimination of the weirs. Undoubtedly, however, there would be an increase.

Production of red shrimp, in spite of the abundance of the species, is least likely to expand. The concentrations of red shrimp are in depths much greater than those now fished by the trawl fleet. Because of their small size many of these shrimp taken in shallower waters are now discarded by the fishermen. It is improbable that the catch of red shrimp will increase much because of their small size, because of the lower price paid for them, and because, if fishing is to be extended to the depths at which they abound, winch capacities would have to be increased.

The catch of brown shrimp on the west coast of Mexico has been increasing since 1950, and it is probable that it will continue to rise.

The catch on the east coast of Mexico appears to be leveling off. On the east coast the stocks of shrimp are fished jointly by United States and Mexican fleets. The catches of shrimp in the Gulf of Campeche seem to have leveled off, thus indicating maximum production under present methods of operation. An increase in the size of the Mexican fleet in relation to the United States fleet could increase Mexican production. Some increase in brown shrimp landings at Tampico can be expected, but the extent of this increase will probably not be great.

There do not appear to be any immediate prospects for developing a fishery for deep-water red shrimp (Hymenopenaeus robustus) by Mexican fishermen in the Gulf of Mexico.

From an overall view it looks as though Mexico has reached a peak in shrimp production and, on the west coast, may have passed it as far as blue shrimp are concerned.

COOPERATIVES

In Mexico the catching of shrimp is reserved for members of legally authorized fishery cooperatives. No other person can take shrimp legally in Mexico for commercial purposes.

Throughout all of Mexico in 1954, according to official figures, there were 145 fishery cooperatives with a membership of 10,508. Of these, 84 cooperatives with 9,834 members were licensed to fish for shrimp (table 16).

TABLE 16.--MEXICAN SHRIMP-FISHERY COOPERATIVES, NUMBER AND MEMBERSHIP, 1954

State	Cooperatives	Members
Baja California	2	45
Sonora	19	1,282
Sinaloa	23	3,201
Nayarit	4	459
Oaxaca	2	120
Chiapas	13	1,215
Tamaulipas	4	232
Veracruz	8	1,695
Tabasco	2	86
Campeche	7	1,499
Total	84	9,834

The number of cooperatives that fished for shrimp represented only 58 percent of all fishery cooperatives, but these shrimp cooperatives had 94 percent of the total membership.

The west coast had 75 percent of the shrimp cooperatives and 64 percent of the total membership. Less than half of the fishermen associated with shrimp cooperatives are employed full-time in the shrimp fishery. The remainder fish part-time for other species or are engaged part-time in agricultural pursuits.

There are actually more fishermen than shown by the cooperatives' records. This is particularly true of part-time fishermen, who as a rule are not listed on the cooperatives' registers. Between full-time and part-time fishermen there are probably at least 9,000 on the west coast, distributed as follows: 3,500 aboard trawlers, 4,500 "canoa" fishermen, and 1,000 working the "tapos." On the east coast there are about 2,200 fishermen, 1,100 of which work full time aboard trawlers.

The cooperatives work under contracts approved by the Ministries of Economy and Marine. The trawler fleet on the east coast has worked on an annual contract. There has been some interest in developing a 2-year contract. The west-coast trawler fleet is operating on a 2-year contract that expired in September 1956.

The west coast contract calls for a payment of P/1,780 36/ per metric ton (2,204.6 pounds) of shrimp tails when the trip catch is 2 tons or less and P/1,810 per ton for trips with more than 2 tons. The money is distributed as follows:

Pesos per metric ton	Distribution	United States cents per pound
920	Crew shares	3.4
220	Severance tax	.8
150	Banco Fomento Cooperativo	.5
300	Cooperativo for local overhead	1.1
50	Cooperativo federation overhead	.2
40	Cooperativo confederation overhead	.1
100	Crew insurance	.4
1,780	Total	6.5
30	Cooperativo local overhead	.1
1,810	Grand total	6.6

36/ The peso since its devaluation April 19, 1954, has been equivalent to about 8 cents United States currency. All further references to dollars and cents in this section refer to United States currency.

Actually the Mexican shrimp-fishery cooperatives are mostly cooperatives in name only. Since only cooperative fishermen can catch shrimp, practically the entire frozen-shrimp industry is supplied by "white" 37/ cooperatives. Of the 84 cooperatives authorized to fish for shrimp, probably no more than 20 operate as originally intended, and these fish almost exclusively in inland waters. The trawling fleet, which is prohibited by law from fishing in the estuaries, is manned almost entirely by "white" cooperative fishermen. The exception to the general rule so far as shrimp cooperatives are concerned occurs in Guaymas where at least three cooperatives own and operate from one to three trawl boats each.

Mexican producers' cooperatives are organized into regional federations and a national confederation. The functions of the federation are to represent the various affiliated cooperatives and to sell and buy, in common, the products of and purchases for the member cooperatives. The federation is composed of not more than three representatives from each cooperative. The federations are regional and are organized along product lines, that is, only fishery cooperatives can belong to a fishery federation.

The confederation is national and represents all producers' federations regardless of the nature of their product. No federation can have more than two representatives in the confederation. The confederation may also buy and sell, in common, the products of the federations.

FISHING METHODS, VESSELS, AND GEAR

There are three general methods of fishing for shrimp in Mexico: cast nets, "attarayas"; traps or weirs, "charangas," "tapos," or "cierras"; and otter trawls.

Cast nets are used only in estuaries or bays and are generally operated from dugouts, "canoas"; cast-net fishing is most prevalent on the west coast of Mexico in the estuarine waters between Guaymas and Mazatlan but is also done in the bays between Salina Cruz and the Guatemalan border.

37/ Common parlance uses "cooperativo rojo" (red cooperative) to mean a cooperative that is legal with respect both to statute and to intent; a "cooperativo blanco" (white cooperative) is legal with respect to statute only.

Usually there are three men to a dugout, two casting and one rowing. About 4,500 men are employed in this fishery along the west coast. The bulk of this type of fishing is seasonal, from July or August until December. The remainder of the year the men find employment in agricultural or other fishing endeavors.

The dugouts are hollowed from a single tree trunk; the "guanacastle" is preferred. They are usually between 15 and 25 feet in length and are fitted so a sail can be stepped in. More and more of the dugouts are being fitted with outboard motors, a fairly recent innovation in this fishery.

The cast nets are 14 to 16 feet in diameter, and considerable skill is required to throw one from a dugout. Fishing is usually in shallow depths, but successful operations have been observed in 6 to 8 fathoms.

The customary practice is for the men to leave port before dawn and return in the early afternoon. The shrimp are not headed while fishing, nor is it common to carry ice. Usually the catch is protected by a tarpaulin and the heads are removed ashore.

The "tapos" or "cierras" are a west coast device that apparently originated before the Conquest. They are used in estuarine waters between Mazatlan and San Blas. There are about 1,000 men employed in the shrimp "tapo" fishery. The season extends from July or August until December. Like the cast-net fishermen, the "tapo" fishermen find employment in agriculture or other types of fishing during the off season.

The "tapo" is a weir consisting of three principle parts: the wings, the body, and one or more pens. Depending upon the terrain, a "tapo" may be less than 100 yards long or it may extend several kilometers. It is designed to block off an estuary or bayou, concentrating seaward-migrating young shrimp in the pens. The wings consist of two parallel rows of palmetto trunks driven into the bottom. The rows are 6 to 8 inches apart, and the space between is filled with cut brush well stamped down. Towards the center of the weir, or the part where tidal currents are strongest, the body and pens are placed. The body consists of palmetto petioles or mangrove poles, about 1 inch in diameter, lashed closely together in the form of a mat. The lashings are made from palmetto fronds. These mats are fastened to pilings in such a fashion as to make a weir. The pens or "chiqueros" are kidney-shaped and made of the same matting as the body of the weir. They are 6 to 8 feet in their longest dimension. A narrow V-shaped lead runs

from the body to the center of the pen. At the rear of the pen is a platform upon which the fisherman stands for dipping out the shrimp as they enter. The wings and body of the weir form a barrier that tends to force the shrimp into the pen.

Fishing is done at night on the outgoing tides. The best catches are associated with the falling tides during full and new moons.

The weirs are fairly impervious; differentials in water level of as much as 2 feet have been observed between the upstream and downstream sides of a "tapo."

As the shrimp are dipped from the pens they are placed in a dugout that is tied nearby. Ice is rarely used. Tapo-caught shrimp are dried, canned, or frozen.

On the east coast of Mexico, in Laguna Tamiahua, another type of trap is used for taking seaward-migrating young shrimp. This trap is a V-shaped structure made of brush and called a "charanga." About a thousand fishermen work part-time on the "charangas."

The "charanga" is a much simpler device than the "tapo." It is merely cut brush stuck in the mud in shallow water to form a "V." The sides of the "V" are 30 to 100 feet long with the opening facing the outgoing tides. The apex narrows down to 2 or 3 feet in width where a fiber-meshed screen is placed to block the escape of the shrimp. Occasionally a single "charanga" will be found by itself, but the usual practice is to have a series of them, each connected to the other, thereby forming a long chain of V's, side by side.

Fishing is done at night. A kerosene lantern is hung in the apex of the"V"where the fisherman also ties his dugout. At frequent intervals he scoops the shrimp from near the screen with a dip net and empties the catch into the dugout. On nights when the "charangas" are being operated, Tamiahu lagoon, from the air, appears to be a sizeable village with the street lights neatly laid out in even rows.

No ice is used, since the fishermen deliver their catches shortly after dawn. The shrimp are boiled in brine immediately and either sun dried or peeled and shipped to the interior.

The above-described fishing methods are primitive. Some of them evidently were used before the arrival of Cortes. They are still being used, and more than 6.6 million pounds of shrimp are taken each year with them. The otter trawl, however, is the mainstay of the Mexican shrimp fishery. There are about 750 trawlers fishing for shrimp in Mexico, 250 on the east coast and 500 along the west coast.

Practically all of the east-coast trawlers are Florida-type. A few have steel hulls, but most of them are of wooden construction. In length the vessels range from about 40 to 75 feet, overall. The average boat is about 55 feet long and represents a capital investment of about $20,000.

On the east coast the most popular net for white and brown shrimp is the 95-foot (at the mouth) flat trawl. For pink shrimp, generally a 75-foot balloon trawl is used. The lead line is rigged with chains, and a chain spacer of from 6 to 14 feet is used between the otter boards and the net. The general practice is to use tarred webbing of 18-thread, $2\frac{1}{2}$-inch, stretched mesh in the wings and body, and 42- or 48-thread, $2\frac{1}{4}$-inch to $2\frac{1}{2}$-inch, mesh in the bag. The boats average about six new nets a year; while the net lasts, it is continually being repaired.

The otter boards are usually 10 feet long by 40 inches high.

The towing cables are generally 7/16 inch in diameter and 750 to 900 feet long. They last from 8 to 12 months before replacement and are treated with cable compound or tar every 2 or 3 months, whenever they appear to need treatment. The towing winches are mostly three drum, although there are a few two-drum winches.

Practically all boats use try nets and carry marker buoys fixed with lights for night fishing. Most boats tow the main net from the starboard side, but some tow from the port side. The try net is towed from a boom on the side opposite the main net.

The crews are mostly composed of five men, although some of the smaller boats carry only four men.

White shrimp are caught during the day, brown and pink at night. Trips are generally less than 7 days' duration.

West-coast trawling operations differ from those on the east coast in that most of the boats follow the California purse-seine design. Buoys are not used to mark fishing spots; there are no spacers between the net and the doors; there are 6 to 8 crew members, normal complement being 7; and trips usually last about 12 days.

PRODUCTION COSTS

General

It is difficult, in most instances, to secure precisely identical cost data from different sources. Bookeeping practices vary widely. A serious attempt has been made here to study only comparable data. In order to obtain comparability it has been necessary to dispense with much detail. Some of the detail is covered in the discussion of the material.

Since fishing, processing, and transportation practices on the east coast of Mexico differ considerably from those on the west coast, each coast will be treated separately whenever sufficient data are available.

The samples of operations used for cost comparisons, necessarily, were small, and consequently only certain general conclusions can be drawn from the data.

East coast

Both 1952 and 1953 were profitable years for the boat owners, with 1953 generally being a better year than 1952 (table 17). In 1954, in spite of the devaluation, many of the boats operated at a loss. This situation continued into the early part of 1955, but later in that year prices increased and most boats showed a profit for the year.

In 1954, the average cost of producing shrimp in Ciudad del Carmen was probably between 25 and 35 cents per pound.

TABLE 17.--TOTAL BOAT-COSTS FISHING FOR SHRIMP AND PROFITS OR LOSSES, CIUDAD DEL CARMEN, MEXICO, 1952, 1953, 1954, AND FIRST QUARTER 1955
(Headless basis)

Year and boat	Catch	Total cost	Profit
	pounds	cents per pound	cents per pound
Year 1952:			
Boat 1	107,300	22.91	4.49
Boat 2	105,000	22.28	5.88
Boat 3	91,300	25.93	2.14
Boat 4	94,600	24.39	3.37
Year 1953:			
Boat 1	87,800	31.20	7.00
Boat 2	79,800	33.16	7.28
Boat 3	90,100	28.57	5.22
Boat 4	92,100	24.15	8.09
Year 1954:			
Boat 1	76,100	27.61	0.11 (Loss)
Boat 2	71,100	25.83	1.87
Boat 5	56,000	32.16	4.49 (Loss)
Boat 6	60,000	36.06	7.43 (Loss)
Boat 7	73,800	26.26	3.93
Boat 8 (8 months only)	52,800	26.42	2.74 (Loss)
First Quarter, 1955:			
Boat 1	13,100	33.78	1.71 (Loss)
Boat 2	16,800	28.32	6.29
Boat 5	14,000	37.61	5.49 (Loss)
Boat 6	19,300	28.46	1.96
Boat 7	24,500	21.20	14.96
Boat 8	9,200	41.39	12.25 (Loss)

The characteristics of the boats used in this analysis are shown in table 18. The boats are all company owned.

TABLE 18.--CHARACTERISTICS OF BOATS USED IN COST ANALYSIS, CIUDAD DEL CARMEN

	Type	Length (feet)	Horse-power	Net tonnage	Age (years)	Number in crew
Boat 1	Wood	55	165	20	8	5
Boat 2	Wood	62	165	33	10	5
Boat 3	Wood	67	200	30	8	5
Boat 4	Wood	54	150	20	8	5
Boat 5	Wood	50	150	16	10	5
Boat 6	Wood	57	200	25	10	5
Boat 7	Wood	62	200	30	10	5
Boat 8	Wood	50	165	15	8	5

In arriving at profits or losses for company-owned boats, it is the practice of the bookkeepers to enter local going prices for each delivery of shrimp. In Ciudad del Carmen about 40 percent of the boats are company owned. Prices fluctuate with market value and vary according to size and species of shrimp.

Figure 12.--A typical Ciudad del Carmen, Mexico, shrimp boat.

The details of production expenses during 1954 for three boats is given in table 19. Both trip and boat costs per pound of shrimp caught are probably below normal in relation to the amount of shrimp taken, because of the devaluation of the currency and the tendency of the boat owners to cut down on expenses as operations became less profitable.

TABLE 19.--TRIP EXPENSES AND BOAT EXPENSES, CIUDAD DEL CARMEN, 1954
(Converted to cents per pound of shrimp, headless basis)

Item	Boat 5	Boat 6	Boat 7
Trip expense:			
Crew wage	4.83	5.53	4.96
Ice	4.00	3.70	3.23
Fuel and oil	3.29	3.59	2.59
Handling and cartage	0.37	0.25	0.38
Food	1.39	1.40	1.12
Total trip expense	13.88	14.47	12.28
Boat expense:			
Repairs and maintenance	8.42	12.08	4.67
Fishing gear	3.75	3.31	2.57
Insurance	3.05	3.79	3.14
Depreciation	2.57	1.91	3.11
Miscellaneous 1/	0.49	0.50	0.49
Total boat expense	18.28	21.59	13.98
Grand total expense	32.16	36.06	26.26
Catch	Pounds 56,000	Pounds 60,000	Pounds 73,800

1/ Cooperative charges were prorated at .41 cent per pound. Cooperative charges were .51 cent per pound for first 4 months and .36 cent per pound the remainder of the year.

Crew wages.--Crew wages accounted for 15 to 20 percent of total expense. The fishermen in Ciudad del Carmen are paid on a share basis depending on the amount of the catch. They are also paid bonuses when their catches exceed an amount set by the boat owner. Bonuses were started on a monthly basis but the tendency has been towards awarding them on a trip basis since it is suspected that once the catch reaches a level where the maximum monthly bonus amount is applicable, the fishermen are inclined to slack-off in their efforts. The bonuses are paid to the captains who distribute them among the crew in accordance with previous arrangements. The bonus ranges between 500 and 800 pesos ($40 to $64) monthly. For trips on which the catch exceeds a certain set amount, the bonus generally amounts to a 10-percent increase in pay.

The crews are almost all made up of five men, although some of the smaller boats carry only four men. The amounts paid for the catch vary from owner to owner. The one standard practice is to pay less for small shrimp. For large shrimp, 26 to 30 to the pound, headless, the shares range between the following amounts per kilogram (2.2 pounds) of shrimp caught:

	Centavos	Cents
Captain	40 to 65	3.2 to 5.2
Engineer	25 to 50	2.0 to 4.0
Winch man	20 to 30	1.6 to 2.4
Hands	10 to 25	.8 to 2.0

Owners who pay the smaller amounts also pay the crew 10 centavos a kilogram (headless weight) for heading the shrimp. On small shrimp, 31 to 35 per pound, headless, some owners pay a flat 50 centavos a kilogram to the crew. The general practice is to pay per kilogram as follows:

	Centavos	Cents
Captain	30	2.4
Engineer	20 to 30	1.6 to 2.4
Hands and winchman	10 to 20	.8 to 1.6

It is also a general practice to pay the crew a salary during the time a boat is laid up for repairs, but not when the lay-up is due to unfavorable weather. Some owners pay the crew for every day the boat is laid up for repairs, others do not begin payments until the third or fifth day. Payments for these lay days also vary. They range as follows:

	Pesos	Dollars
Captain	15 to 30	1.20 to 2.40
Engineer	10 to 20	.80 to 1.60
Remaining crew	10 to 15	.80 to 1.20

At Tampico, the boat owners contract annually with the fishing cooperative for a fixed price per ton. The 1955 price was 1,700 pesos ($136) a metric ton of headless shrimp. From this amount the cooperative pays the severance tax of 220 pesos ($17.60) a metric ton.

The 1.70 pesos a kilogram paid to the cooperative is distributed as follows: 60 centavos among crew at end of each trip; 65 centavos among certain members of crew at end of each month; 22 centavos for severance tax; and 23 centavos for operating expenses of the cooperative.

The sum of 60 centavos paid at the end of each trip is distributed equally among the crew--15 centavos each if there are 4 crew members, 12 centavos each if there are 5. In addition to the 12 or 15 centavos per kilogram of catch, the hands get only their food. Of the 65 centavos paid at the end of each month, the captain gets 40 centavos, the engineer 20, and the cook 5. In addition, the boat owners pay their better captains a bonus which may run as high as 1 peso a kilogram. The 23 centavos withheld for cooperative operating expenses covers medical expenses for the members. If any funds remain at the end of the year, they are distributed among the members.

The fleet averages about 7,700 pounds per boat per month. On the basis of this catch the average monthly wage of the crew is as follows:

	For crew of 4		For crew of 5	
	Pesos	Dollars	Pesos	Dollars
Hands	525	42	420	33.60
Cook	700	56	595	47.60
Engineer	1,225	98	1,120	89.60
Captain	1,975	158	1,870	149.60

These figures do not include the bonus paid the better captains; for the best of the captains this bonus may run to more than $300.

Ice:-In Ciudad del Carmen, ice costs (December 1955) 85 pesos a short ton (2,000 pounds) at the plant, and delivery charges are between 5 and 8 pesos a ton. A rule of thumb in Carmen is to calculate that 1 ton of ice will be used per fishing day. The boats average about 20 fishing days a month.

Fuel and oil:-In Carmen (December 1955) diesel fuel costs 19 centavos a liter (1.5 cents for 1.0567 quarts) and gasoline 80 centavos (about 6 cents) a liter. Oil is 875 pesos ($75) for a 200-liter drum. Only lubricating oil manufactured in the United States is used. Boat owners claimed that Mexican oil ruined the motors. Only one brand of United States oil was in evidence. It is anticipated that locally produced oil will be improved.

Handling and cartage:-Handling and cartage charges cover delivery of ice and fuel.

Food:-In Carmen, the boat-owner pays a flat 5 pesos (40 cents) a day for food for each man or 25 pesos ($2) daily per boat. In Tampico, the practice is to pay 30 pesos ($2.40) daily per boat regardless of whether there are four or five crew members. This amounts to an additional compensation for the crews of the smaller boats.

Repairs and maintenance:-Repair and maintenance expenses vary widely from boat to boat and from year to year, depending on the age of the vessel and engine and the recency of major overhauls. The figures shown for this item in table 19 probably are below normal, since 1954 was not a profitable year.

In Carmen the insurance companies insist that the boats be hauled and copper-painted at least once every 4 months. For a 55-foot boat, haulouts cost 500 pesos ($40) and lay days 50 pesos ($4) each. The day of hauling out is not considered a lay day.

Fishing gear:-On the average, a boat appears to use about six new nets a year. While a net lasts, it is continually undergoing repair. A new net costs about $240 and 10-foot by 40-inch doors about $130 a pair.

Towing cables last from 8 to 12 months. They are treated with a patented cable-compound or with tar whenever they appear to need treatment, which is usually every 2 or 3 months.

Practically all webbing is now made in Mexico. The cables are imported either from the United States or from Germany. The doors are manufactured locally.

Insurance:-Full-coverage insurance costs 7½ percent for 10-percent deductible. Most boats are covered only by total-loss and cost-of-salvage which runs about 5 percent annually. This amount may be decreased by 10 percent if no towing charges have been accumulated during the year. If a Carmen shrimp-trawler breaks down at sea and is towed to port by another trawler, the latter charges for towing. There is also a federal tax of 5½ percent on the premiums.

For a boat valued at 260,000 pesos, or $20,800, which does not owe any towing charges, the annual insurance premium for total loss and salvage would be about $1,000.

The above rates prevail throughout Mexico.

Depreciation:-The usual accounting practice is to depreciate the hulls in 10 years and the engines in 5 or 6 years.

Miscellaneous:-Under this heading are included the cooperative "factura" charges, medical supplies and services, boat dispatch or port clearance charges, and donations.

The "factura" is a bill of sale issued by the cooperative, establishing that cooperative fishermen caught the shrimp. By law, all shipments of shrimp must be covered by a factura. The factura charge in Carmen is a standard 10 centavos a kilogram (about .5 cents a pound before devaluation and .4 cents a pound since). It is a service charge and not a tax.

Since the fishermen are not covered by social security, the boat owners pay for medical supplies and services for injuries or illness.

According to Mexican law, the captain must report the amount of catch to the fishery office on returning from each trip and must obtain clearance for the next trip before the port captain will allow departure. Minor charges usually accrue from these procedures. These regulations apply to all of Mexico.

West coast 38/

The cost of trawl-caught shrimp on the west coast of Mexico for the 1954-55 season probably averaged between 30 and 40 cents a pound (table 20). These costs do not appear to differ significantly from the costs for the 1953-54 season.

38/ Prices or costs of specific items such as fuel, ice, etc.,are those prevailing during the winter of 1955-56.

TABLE 20.--BOAT COSTS FOR SHRIMP, MAZATLAN

(Headless basis)

Season 1/	Total catch (pounds)	Cost per pound (cents)
Season 1952-53:		
Boat A	48,000	2/ 68.23
Boat B	53,300	2/ 68.58
Boat C	99,900	37.14
Season 1953-54:		
Boat A	100,200	36.57
Boat B	108,700	32.61
Boat C	109,000	34.58
Season 1954-55:		
Boat A	52,300	38.25
Boat B	70,000	35.53
Boat C	76,500	32.51

1/ Season extends from October one year through July the following.
2/ Boats underwent major repairs.

Figure 13.--A typical shrimp boat from the west coast of Mexico.

A breakdown of costs into elements of expense is shown in table 21.

TABLE 21.--TRIP EXPENSES AND BOAT EXPENSES, MAZATLAN

(In cents per pound, headless basis; season extends from October of one year through July of following year)

Item	1952-53 season			1953-54 season			1954-55 season		
	Vessel A	Vessel B	Vessel C	Vessel A	Vessel B	Vessel C	Vessel A	Vessel B	Vessel C
Trip expense:									
Crew wage	11.52	12.13	8.81	11.53	10.80	11.18	11.13	10.38	9.82
Ice	1.99	2.19	1.67	1.50	1.38	1.51	1.86	1.55	1.54
Fuel and oil	3.86	3.25	2.70	2.50	1.89	2.28	3.23	2.81	2.98
Food	3.20	3.08	2.05	2.37	2.22	2.38	3.12	2.64	2.42
Total	20.57	20.65	15.23	17.90	16.29	17.35	19.34	17.38	16.76
Boat expense:									
Repairs, maintenance, and fishing gear	1/28.33	1/29.73	10.43	8.50	7.16	7.89	8.22	8.35	6.52
Insurance	4.27	3.85	2.05	2.05	1.89	1.87	3.28	2.92	2.67
Depreciation	2/12.23	2/11.03	2/5.88	2.69	2.48	2.48	3.93	3.52	3.22
Miscellaneous 3/	2.83	3.32	3.55	5.43	4.79	4.99	3.48	3.36	3.34
Total	47.66	47.93	21.91	18.67	16.32	17.23	18.91	18.15	15.75
Grand total	68.23	68.58	37.14	36.57	32.61	34.58	38.25	35.53	32.51
Catch, in pounds	48,000	53,300	99,900	100,200	108,700	109,000	52,300	70,000	76,500

1/ Boat underwent extensive repairs.
2/ Includes interest.
3/ Includes cooperative charges other than crew share.

The boats used in this analysis are company-owned sister ships. They are identical in that each is 6 years old, 56 feet long, of 22 net tons, with an 85-horsepower diesel engine, and carries a 7-man crew.

Crew wage:--The crews are paid on a share basis according to contract. In addition, the captain, the engineer, and in some instances the assistant engineer are paid bonuses by the boat owner. It is not customary to pay different amounts for small and large shrimp.

The crew share, for the 2-year contract period ending during late summer 1956, was 920 pesos a metric ton (about $74 for 2,204.6 pounds) of headless shrimp. The method of distributing this amount seems to vary somewhat with different cooperatives. Some divide it evenly among all crew members, others allow a bit more for the captain and engineer than for the hands. In either instance the total wage of a hand consists only of his share, since he does not get a bonus.

The extra amounts paid the technical personnel vary greatly. One company pays the captain 600 pesos ($48) a metric ton and the engineer 500 pesos ($40) a ton plus 10 pesos (80 cents) daily. If the engineer chooses, he may get the same amount per ton as the captain but without the daily wage. Another company pays a straight salary of 20 to 25 pesos ($1.60 to $2.00) daily throughout the year to the captain and engineer. In addition, these men, depending upon their ability, are paid 150 to 250 pesos ($12 to $20) for each ton of headless shrimp landed by their boat. Still another company pays the captain and engineer, and sometimes the assistant engineer, 25 to 30 pesos ($2.00 to $2.40) daily during the off season (August and September) and a bonus per ton of 700 pesos ($56) to the captain, 500 ($40) to the engineer and 100 ($8) to the assistant engineer.

Ice:--The price of ice varies according to locality. At Guaymas and Mazatlan it runs between 60 and 65 pesos ($4.80 to $5.20) a ton, crushed and delivered aboard boat. At Salina Cruz it costs about $8 a ton. During the height of the season at Salina Cruz, ice has been brought in from as far away as Mexico City and Veracruz.

Fuel and oil:--Because of transportation charges, diesel fuel is more expensive in Guaymas and Mazatlan than in Salina Cruz. Along the northern coast, diesel oil costs 25 centavos (about 2 cents) a liter, while in Salina Cruz it costs 17 centavos (about 1.4 cents).

Food:--On the west coast, food is not calculated on the basis of so much per man per day; it is customary for the boat owner to pay all food bills for each trip. The trips generally last 10 to 15 days, usually about 12. The food bill amounts to 1,200 or 1,300 pesos ($96 to $104) a trip.

Depreciation:--The general accounting practice is to depreciate the hulls in 10 years and the engines in 6. One company, though, claimed to have depreciated the hulls in 30 years and the engines in 10, taking an average of 20 years for hull and engine combined.

Miscellaneous:--The largest of the items grouped under "Miscellaneous" consists of cooperative charges. See section on Cooperatives for breakdown on these charges.

Comparison east and west coasts

For comparing shrimp-production costs between the east and west coasts of Mexico, the calendar year 1954 was chosen for the east coast and the 1954-55 season for the west coast. From the summarized and averaged data in table 22, it appears that the east coast is able to produce headless shrimp for about 4 cents a pound less than the west coast. Probably the advantage to the east coast is even greater because, in the small sample of boats from which reasonably complete records were studied, repair costs of two of the east-coast boats seemed to be unusually heavy. Of course, this difference in production cost is compensated for by higher prices received for the shrimp catch on the west coast.

TABLE 22.--AVERAGE FISHING COSTS FOR SHRIMP CAUGHT ON EAST AND WEST COASTS OF MEXICO

(In cents per pound, headless basis)

Item	East coast, 1954 1/	West coast season 1954-55 2/
Trip expense	13.54	17.83
Boat expense	17.95	17.60
Total fishing cost	31.49	35.43
Season catch, in pounds	63,000	66,000

1/ Average of data from 3 vessels in table 19.
2/ Average of data from 3 vessels in table 21.

Most of the difference in cost can be explained by the crew wages: crew earnings on the west coast were about twice those on the east coast. Food costs were also about twice as much, and miscellaneous costs, mostly cooperative charges, were more than twice as much as on the east coast. Ice costs on the east coast, however, were more than twice as much as on the west coast. Fuel and oil, insurance, and depreciation costs on the two coasts were about the same.

PROCESSING AND MARKETING

The catch of the trawl fleets of both coasts is always headed at sea and iced down in the holds of the vessels. A relatively small amount is frozen and packaged at sea, aboard freezer boats. On the west coast of Mexico the shrimp caught in the bays and estuaries with cast nets are generally landed whole and not iced. The shrimp are headed at the landing places, iced, and trucked to the shore freezers for freezing and packing. In the estuaries between Mazatlan and San Blas, where small shrimp are caught at night in weirs called "tapos" or "cierras," the handling varies. Shrimp destined for canning or freezing are iced whole in the trucks which transport them to the packing plants. Those destined for drying are immediately boiled whole in brine and spread on the ground to dry.

Figure 14.--Dipping shrimp from weir near Escuinapa, Mexico. Normally fishing is done at night but on occasions shrimp runs occur during the daytime.

Figure 15.--"Tapo" or weir used for catching young shrimp in estuarine waters on the west coast of Mexico. The part of the wing in the immediate foreground is brush filled between two rows of piling which leads to the narrower "palapa" barricade comprising the section of the weir near the "chiqueros" or pens from which the shrimp are dipped. Two "chiqueros" are shown here.

The small platform appearing to the rear of the "chiquero" on the right is where the fisherman stands while dipping out the shrimp. His dugout into which the shrimp are emptied is tied alongside this platform or "tapestle."

In Tamiahua Lagoon, on the east coast, where shrimp are also caught in weirs called "charangas," they are landed without ice. As with the "tapo" shrimp, some are boiled and dried. Some are iced and shipped whole to the interior, and others are shipped cooked-peeled for local consumption.

Drying

The drying of shrimp is an ancient practice in Mexico, probably dating to preconquest times. The more important drying centers are in the States of Sinaloa, Nayarit, and Chiapas on the west coast and Veracruz on the east coast. According to official statistics, in 1954 over 3.3 million pounds of whole dried shrimp and more than 88,000 pounds of dry peeled shrimp were produced. Some dried shrimp are exported to Guatemala, but most of the dried shrimp are consumed within Mexico.

The shrimp used for drying are mostly the small young ones taken in estuarine waters. They are boiled in strong brine for about 5 minutes and are then spread on mats, on concrete platforms, or on the ground, to dry. They are exposed to the direct rays of the sun but are turned several times a day to permit even drying. If rain threatens, the shrimp are moved to shelter.

Figure 16.--"Tapo" or weir-caught shrimp being dried on the ground near Escuinapa, Mexico.

Generally, 3 to 5 days are required for drying whole shrimp. These are usually not completely dried but retain a fair quantity of moisture. The primary purchaser completes the drying in his establishment.

For dry-peeling purposes the shrimp are allowed to dry more thoroughly. After drying they are thrashed and winnowed to remove the heads and shells.

Canning

There are seven canneries on the west coast of Mexico that operate partially or entirely on shrimp. One cannery in Guaymas and one in Los Mochis did not pack shrimp during the 1955-56 season, but one in Topolobampo, one in Culiacan, and three in Escuinapa were in operation.

No records are available of the number of cases of shrimp canned in Mexico. It is estimated that about 1.1 million pounds of whole fresh shrimp are processed by canning each year. This amount would yield a pack of about 25,000 cases. All Mexican canned shrimp are wet pack.

The peeled meats (all peeling is done by hand) are blanched in a strong boiling brine for about 5 minutes. They are then placed for cooling on screens which are covered for protection from flies. Stray pieces of shell, feelers, legs, etc., are removed from the cooled meats which are then packed, by hand, into cans and weighed. In some plants the cans are filled with cold brine and then heated in an exhaust box before capping. In others they are filled with hot brine and capped immediately. The sealed cans are then processed. When processing is completed, the cans are immediately cooled in a tank of fresh water. After cooling, the cans are permitted to dry before labeling and packing in cardboard cartons.

The canned shrimp are sold throughout Mexico.

Freezing

About 75 percent of the Mexican shrimp catch is frozen for export to the United States. For processing and transporting frozen shrimp there are 38 freezing plants, 9 freezing ships, and 4 transport boats. 39/ Freezing capacity is over 600,000 pounds daily.

39/ Not all of this equipment is in operation. During the 1955-56 season at least seven plants and three freezing boats were not in use.

Shore plants and freezing ships are located as follows:

West Coast

Santa Rosalia, B. C.	1 plant (not operating)
Mexicali, B. C.	2 plants
Santa Clara, Son.	1 plant (not operating)
Puerto Penasco, Son.	2 plants
Guaymas, Son.	6 plants (2 not operating)
Guaymas, Son.	4 freezing ships
Topolobampo, Sin.	1 plant
Topolobampo, Sin.	1 freezing ship
Guasave, Sin.	1 plant (not operating)
La Reforma, Sin.	1 plant
Culiacan, Sin.	1 plant
El Dorado, Sin.	1 plant (not operating)
Mazatlan, Sin.	6 plants (1 not operating)
Mazatlan, Sin.	1 freezing ship (not operating)
Escuinapa, Sin.	2 plants
Acapulco, Gro.	1 freezing ship
Salina Cruz, Oax.	2 plants (1 new and not operating)

East Coast

Tampico, Tamps.	1 plant (under construction)
Tampico, Tamps.	1 freezing boat (not operating)
Veracruz, Ver.	2 plants (do not operate full time on shrimp)
Cuidad del Carmen, Camp.	9 plants
Cuidad del Carmen, Camp.	1 freezing boat (not operating)
Lerma, Camp.	1 plant

There are probably about 2,500 full- and part-time workers, mostly women, employed in the freezing plants.

As the shrimp enter the plant they are placed in metal tanks containing ice and water for washing. If too many shrimp arrive for immediate handling, the excess is stored with ice in holding rooms or bins until it can be processed. From the washing tank they are removed either by a mechanical carrier or by scoop nets and placed on a moving

metal inspection-belt where spoiled, black spotted, and broken shrimp are removed. On the west coast, the shrimp are weighed directly after passing inspection. On the east coast, where the price paid the boat owner varies according to size of shrimp, the shrimp are run through a grading machine before weighing. Most east coast plants have grading machines, whereas the west coast plants generally did not, for the first grading machines were introduced there during the 1955-56 season. The large run of brown shrimp that season was instrumental in inducing a number of west-coast plant managers to investigate grading machines. The managers were encountering a decided bottleneck in their packing departments.

On the west coast, where most of the pack is layered, grading and packing are usually done as one operation. Women remove the shrimp, either from a belt or from a table, and arrange them in rustless-metal trays holding 5 pounds of shrimp. 40/ Most of the east coast pack is jumbled. The shrimp are placed directly in the carton and frozen without regard to arrangement.

The west-coast pack is mostly solid glaze while the east-coast generally is top glaze only. On the west coast, water is added to the trays before freezing and more water is added when the frozen shrimp are removed from the trays and placed in cartons. East-coast shrimp are usually frozen in the carton without added water. On removal from the freezer, the carton tops are opened, water added, the tops closed, and the cartons stored upside down in the holding rooms where the glaze forms.

The frozen shrimp are packed in 50-pound master cartons for shipping. Here again the east and west coast practices differ. East-coast shrimp are carried to the United States (Brownsville, Texas, usually) by boat, and as a consequence the master cartons, in addition to being sealed by staples or glue or both, are bound by a metal strap. Generally only one strap is used. With the exception of an occasional shipment from Salina Cruz, which goes by water, all west-coast frozen shrimp are transported to the United States by rail or by truck. For overland shipment, strapping is not used on the cartons.

On both coasts some of the pack is put up in 10-and 12-ounce retail cartons. All of these are unglazed but overwrapped. At least one plant on the west coast packs the 5-pound institutional carton unglazed and overwrapped.

40/ On the west coast 31/40 shrimp and larger are layer-packed. Shrimp 41/50 and smaller are packed upper layer only.

More and more interest is being shown on both coasts in peeled and deveined shrimp. These are usually packed in the 5-pound institutional carton. Peeling and deveining is all done by hand.

The general practice is to peel black-spotted shrimp. Some plants peel broken shrimp, others merely freeze them as "broken pieces" without peeling.

FREEZING COSTS

In Cuidad del Carmen freezing costs (winter 1955-56) for the 5-pound institutional pack were about 5 cents a pound. The costs for this pack in Guaymas and Mazatlan appeared to be a trifle higher. The difference seemed to be in labor costs. The west-coast layer pack required more labor than did the east-coast jumbled pack, and wages generally were higher on the west coast than in Carmen. The automatic grading machine also tended to lower packing costs at Carmen.

Packing costs in Carmen appear to have declined more than 2 cents a pound since 1953 (table 23). Some of the decrease in costs can be attributed to the 1954 devaluation of the peso, but much has resulted from increased plant efficiency. Only about 40 percent of the boats in Carmen are company owned. The various freezing plants, consequently, have become highly competitive in order to increase the volume of shrimp handled.

TABLE 23.--FREEZING COSTS FOR JUMBLED INSTITUTIONAL PACK, CIUDAD DEL CARMEN

(In cents per pound. Average of two plants)

Item	1953	1954
Cartons and cases	1/2.50	1/2.50
Labor	1.63	2/.99
Operation and maintenance	3.33	1.75
Miscellaneous	-	.01
Total	7.46	5.25

1/ Estimated.
2/ Automatic grading machine introduced in one plant.

The Carmen plants will freeze for outsiders for 3 to 3.5 cents a pound. The usual price is 3.5 cents. This includes the cost of sorting, packing, and freezing, but does not include storage or the cartons, which must be furnished by the outsider. Freezing for outsiders is not as common on the west coast.

Cartons and cases

Cartons, cases, and strapping for the 5-pound pack are calculated to cost 2.5 cents for each pound of frozen shrimp. Actual cost may be slightly lower, but the standard practice in calculating costs in Carmen is to allow this amount for packaging.

The 50-pound case and the 5-pound carton are now being manufactured in Mexico; previously, all were imported from the United States. Import permits are no longer granted for cases, and permits for cartons are becoming progressively more difficult to obtain. The case seems to be a satisfactory container, but some complaints have arisen with respect to the carton.

Most 10- and 12-ounce cartons are imported. The locally produced are stapled, which causes difficulty in the processing by wrapping machines. All 10- and 12-ounce cartons are without glaze but are overwrapped.

Imported cartons enter under bond. Duties are charged on all that are not exported.

Labor

Plant workers are paid by the hour in Carmen. The women get 1.75 pesos (about 14 cents) and the men 2 pesos (about 16 cents) an hour. The day shift works an 8-hour day and a 48-hour week. The night shift works a 7-hour day and a 42-hour week. Double pay is paid for overtime and holidays.

The plant workers do not belong to unions, nor do they have the benefits of social security. The company pays for medical supplies and care.

On the west coast, with the exception of a few key workers, the plant laborers are paid on a piece-work basis. The salaried women get 25 to 30 pesos ($2.00 to $2.40) daily and the men are generally paid about 5 pesos more.

Most plants on the west coast have incentive-payment plans for pieceworkers. Some plans provide for computation of incentive pay on a daily basis, others on a weekly basis. All plans call for increasing unit payments by steps as the individual's production increases. One plant pays, for grading and packing, 15 centavos (about 1 cent) for each 5-pound pan up to 72 pans per day; for all pans packed beyond this number the payment rises to 25 centavos each (2 cents). Another plant begins with 12 centavos. The packers are usually young women, and the better ones earn 25 to 30 pesos ($2.00 to $2.40) daily. At least one plant provides coffee breaks (coffee free), and many plants furnish transportation without charge.

One plant, handling peeled and deveined shrimp, pay 95 centavos (about 8 cents) for each 5-pound box of peeled and deveined shrimp.

The workers in several plants in Guaymas belong to unions, but those in the other localities do not. Social security does not apply to plant workers, but medical supplies and services are furnished by the companies.

With the increase in arable land through irrigation projects in the States of Sonora and Sinaloa, the freezing plants in this region are finding it more difficult to obtain labor. Many of the workers are moving into agriculture where they find more freedom and shorter hours.

Operation and maintenance

In recent years there has been a notable increase in public power supply throughout Mexico. However, most plants either generate their own power or have auxiliary motors to take over when necessary.

Potable water, in general, is not abundant, and in many places it is quite scarce. The water in Carmen, Guaymas, and Mazatlan comes from wells. All of these towns have recently increased their supply, but fresh water is not abundant in any of them.

It is the usual accounting practice to depreciate the plant in 25 years and the equipment in 10 years.

Marketing

Two brokerage companies in the United States handle the bulk of the Mexican frozen-shrimp production from the west coast. Mexican east-coast production is handled by various brokers, although one predominates.

The general pattern of operations is similar among brokers, although detailed practices may vary. In general, the principle is to charge 5 percent of sales value without advances and 7 percent to 8 percent of sales value with 70-percent advance on shipment. One brokerage company, on notice of shipment, provides 70 percent of estimates sales value, insurance on shipment, and advance on shipping charges. This company also employs a representative in Mexico who attempts to maintain quality control and keep the associates in contact with all modern developments. The company handles about half of the west-coast production and also the production of one of the larger plants on the east coast.

A recent development is the formation, on the west coast, of a cooperative type of sales organization, the stockholder members of which are frozen-shrimp processors hailing from points located all along the west coast. All processors pack under the same brand names, and the product is sold to one brokerage firm in the United States. 41/ The production of this group is estimated at about 40 percent of the total west-coast pack.

The producers, on presentation of a bill of lading, are advanced 70 percent of the going market price and the balance is settled on the sale of the product. As each shipment crosses the United States border it is given a serial number, and sales are liquidated in rotation in accordance with this number.

Sales are liquidated at 93 percent of selling price, the brokerage company charging 7 percent for its services, including insurance on the product while in transit. The Mexican company charges 1/2 of one percent of sales price for its services, so total charges to associates are 7-1/2 percent of sales price.

Financing is done through a United States and a Mexican bank. The United States bank furnishes the funds and the Mexican bank guarantees the loans. For these services the United States bank charges 4-1/2 percent interest and the Mexican bank 1 percent.

On both coasts some producers sell directly to local buyers; this business represents only a small part of the production, although it is probably of greater significance on the east coast than on the west.

41/ This brokerage company also keeps a representative in Mexico who assists the producers in maintaining a uniform pack.

FOREIGN TRADE

General

Mexico, except in 1949, has had an unfavorable balance of trade since 1944. In 1954, imports were worth 8.9 billion pesos ($809.9 million) and exports were valued at 6.9 billion pesos ($627.9 million), the trade deficit amounting to about 2 billion pesos ($182.0 million). To prevent this drain, Mexico has resorted to various measures, such as devaluation, import quotas, and increased import duties.

Most of Mexico's foreign trade is with the United States: in 1954, 80 percent of total imports valued at 7.2 billion pesos ($655.2 million) and 60 percent of total exports valued at 4.2 billion pesos ($382.2 million).

Fish and fishery products represent a favorable item in Mexico's balance of trade with the world and particularly with the United States. In 1954 the value of imported fish and fishery products was less than 6 percent of the value of exported fish and fishery products (table 24).

TABLE 24.--VALUE OF MEXICAN EXPORTS AND IMPORTS, OF ALL FISHERY PRODUCTS
(In thousands)

Year	Exports		Imports	
	Pesos	Dollars	Pesos	Dollars
1952	1/262,846	30,500	12,547	1,500
1953	2/297,537	34,800	9,550	1,100
1954	170,175	15,500	9,722	900

1/ Includes tuna and tuna-like fishes and other fishes caught by United States boats under Mexican licenses and delivered to the United States by these boats.

2/ Includes 55.9 million kilograms (121.2 million pounds) of fish and shellfish valued at 152.8 million pesos ($17.9 million) taken by United States boats under Mexican licenses and delivered to United States ports by these boats.

Note: Average value of peso equaled 11.6 cents in 1952, 11.7 cents in 1953, and 9.1 cents in 1954.

The United States was Mexico's best customer for fishery products in 1954. Our fishery exports to Mexico in 1954 were only three-tenths of 1 percent of the value of her fishery exports to us. Over the 4-year period 1951-54 Mexico imported an annual average of slightly over 10 million pesos (about $1.1 million) worth of edible fishery products of which about 10 percent came from the United States.

Exports

In 1954, shrimp represented 83 percent of the value of all of Mexico's fishery exports. Almost all of the shrimp exports were shipped to the United States. Total shrimp exports in 1954 were valued at 141.9 million pesos ($12.9 million); of this amount 140.6 million pesos ($12.8 million) or 99.1 percent were frozen shrimp.

During 1954, 149 metric tons (328,500 pounds) of fresh shrimp valued at 1.2 million pesos ($109,200) were shipped to the United States.

Mexico's exports of dried and canned shrimp are relatively unimportant.

The value of Mexican shrimp exports has increased over 800 times since 1934. The greatest rise has occurred since 1945.

TABLE 25.--TOTAL VALUE OF MEXICAN SHRIMP EXPORTS TO UNITED STATES AND PERCENTAGE EXPORTED TO UNITED STATES BY PRODUCT, 1951-1954

(In thousands of pesos and dollars; the peso averaged 11.6 cents in 1951 and 1952, 11.7 cents in 1953, and 9.1 cents in 1954.)

Item	1951			1952			1953			1954		
	Value		Percent to U.S.	Value		Percent to U.S.	Value		Percent to U.S.	Value		Percent to U.S.
	Pesos	Dollars		Pesos	Dollars		Pesos	Dollars		Pesos	Dollars	
Dried	31	4	85.6	122	14	99.2	12	2	31.4	61	6	.5
Fresh	2,848	330	100.0	439	51	100.0	897	105	100.0	1,199	109	99.7
Frozen	84,813	9,838	99.7	85,174	9,880	99.9	120,565	14,106	99.6	140,582	12,793	99.9
Canned	12	2	97.8	5	1	1.9	97	11	97.9	49	4	88.5
All forms	87,704	10,174	99.7	85,740	9,946	99.6	121,571	14,224	99.6	141,891	12,912	99.9

For the past several years shrimp has ranked among the 10 most valuable Mexican export commodities.

In 1954, Mexico shipped to the United States 33.7 million pounds of frozen shrimp valued at 140.6 million pesos ($12.8 million). In addition, very small amounts were shipped to Honduras, Puerto Rico, Guatemala, and Canada (see table 26).

TABLE 26.--WEIGHT AND VALUE OF EXPORTS OF SHRIMP FROM MEXICO,

BY PRODUCT AND BY COUNTRY OF DESTINATION, 1951 - 1954

Type of product and country of destination	1951		1952		1953		1954	
	Kilos	Pesos	Kilos	Pesos	Kilos	Pesos	Kilos	Pesos
Dry without shells:								
United States	6,546	26,600	20,366	120,702	513	3,900	26	294
Guatemala	1,037	4,490	224	981	1,549	8,519	9,540	60,271
Total	7,583	31,090	20,590	121,683	2,062	12,419	9,566	60,565
Fresh:								
United States	588,055	2,847,774	106,371	439,417	151,954	897,254	149,242	1,196,311
Philippines	-	-	-	-	-	-	417	3,069
Total	588,055	2,847,774	106,371	439,417	151,954	897,254	149,659	1,199,380
Frozen:								
United States	16,069,324	84,529,006	13,903,990	85,113,177	15,950,836	120,081,832	15,246,157	140,490,777
Canada	-	-	-	-	30,820	226,527	9	191
Costa Rica	9,401	36,892	-	-	-	-	-	-
Cuba	49,895	246,667	-	-	-	-	-	-
Great Britain	-	-	-	-	34,960	256,938	-	-
Guatemala	25	694	-	-	-	-	58	265
Honduras	-	-	-	-	-	-	4,985	59,820
Japan	-	-	12,209	60,838	-	-	-	-
Puerto Rico	-	-	-	-	-	-	3,349	30,562
Total	16,128,645	84,813,259	13,916,199	85,174,015	16,016,616	120,565,297	15,254,558	140,581,615
Canned (weight including container):								
United States	5,133	11,954	7	88	11,762	95,082	5,784	43,770
Canada	-	-	-	-	4	14	685	5,556
Chile	-	-	6	16	-	-	-	-
France	-	-	-	-	4	40	-	-
Great Britain	-	-	19	76	-	-	-	-
Guatemala	50	266	711	4,415	285	1,800	19	110
India	-	-	-	-	-	-	10	48
Lebanon	-	-	-	-	17	173	-	-
Total	5,183	12,220	743	4,595	12,072	97,109	6,498	49,484

Note: 1 kilogram = 2.2 pounds.

Average value of peso was 11.6 cents in 1951 and 1952, 11.7 cents in 1953, and 9.1 cents in 1954.

TABLE 27.--VALUE OF MEXICAN SHRIMP EXPORTS,
1934-1954
(In thousands)

Year	Pesos	United States dollars	Year	Pesos	United States dollars
1934	177	49	1945	2,998	618
1935	410	114	1946	7,001	1,442
1936	351	97	1947	14,526	2,992
1937	644	178	1948	33,855	6,399
1938	801	177	1949	65,474	8,250
1939	852	164	1950	77,102	8,944
1940	1,342	248	1951	87,704	10,174
1941	955	197	1952	85,740	9,946
1942	1,308	269	1953	121,572	14,224
1943	1,929	397	1954	141,891	12,912
1944	1,860	383			

Note: The value of peso averaged 27.7 cents between 1934-37, 22.1 cents during 1938, 19.3 cents during 1939, 18.5 cents during 1940, 20.6 cents between 1941-47, 18.9 cents during 1948, 12.6 cents during 1949, 11.6 cents between 1950-52, 11.7 cents during 1953, and 9.1 cents during 1954.

The increase in value has been to some extent the result of several devaluations of the peso, but for the most part it reflects the increase in volume and unit value of exports.

A more accurate picture of the growth of Mexican shrimp exports can be obtained from the data on physical volume in table 28. Before 1951, Mexican fresh and frozen shrimp exports were reported in gross kilograms; since then they have been reported in net kilograms. Although it appears from table 28 that 1949 was Mexico's best year with respect to exports of fresh and frozen shrimp, the best year was actually 1950, when the United States imported 39.7 million pounds of fresh and frozen shrimp. This was over 10 million pounds more than the United States imported from Mexico in 1949.

TABLE 28.--SHRIMP EXPORTS FROM MEXICO, BY TYPE OF PRODUCT

(From "Anuario Estadistico del Comercio Exterior de los Estados Unidos Mexicanos," Secretaria de Economia, Direccion General de Estadistica.)

Year	Frozen		Fresh		Dried, peeled or unpeeled		Canned	
	Net kilos	Pesos	Net kilos	Pesos	Net kilos	Pesos	Gross kilos	Pesos
1934	(1)	(1)	2/203,151	42,763	232,091	134,209	-	-
1935	(1)	(1)	2/804,783	279,139	189,386	131,334	2	3
1936	(1)	(1)	2/725,565	255,105	109,283	95,857	2	2
1937	(1)	(1)	2/2,309,868	564,217	105,452	80,136	47	80
1938	(1)	(1)	2/3,078,574	692,256	121,843	108,876	-	-
1939	(1)	(1)	2/3,557,229	733,537	125,108	118,088	26	36
1940	(1)	(1)	2/4,051,671	1,301,879	67,965	40,286	13	10
1941	(1)	(1)	2/1,336,669	939,989	18,916	15,300	97	54
1942	(1)	(1)	2/2,560,910	1,234,267	22,099	40,367	18,432	33,757
1943	(1)	(1)	2/3,846,049	1,800,225	50,389	27,051	58,211	101,522
1944	(1)	(1)	2/3,717,700	1,743,768	35,232	115,181	251	956
1945	(1)	(1)	2/4,685,354	2,519,626	25,236	93,765	109,736	384,754
1946	(1)	(1)	2/6,177,852	6,895,040	66,317	105,329	215	428
1947	(1)	(1)	2/6,145,720	14,185,692	(1)	-	107,424	340,517
1948	(1)	(1)	2/10,990,962	33,724,030	(1)	-	65,081	130,900
1949	(1)	(1)	2/19,114,804	65,465,638	(1)	-	1,313	8,647
1950	3/3,591,896	16,503,971	2/14,357,913	60,546,630	3/3,100	13,256	24,694	38,627
1951	16,128,645	84,813,259	588,055	2,847,774	7,583	31,090	5,183	12,220
1952	13,916,199	85,174,015	106,371	439,417	20,590	121,683	743	4,595
1953	16,016,616	120,565,297	151,954	897,254	2,062	12,419	12,072	97,109
1954	15,254,458	140,581,615	149,659	1,199,380	9,566	60,565	6,498	49,484

1/ Included under "Fresh".
2/ Gross kilos.
3/ Mostly included under "Fresh".

Note: 1 kilogram = 2.2 pounds. For value of pesos see note in table 27.

Mexican export figures seem to be understated when compared with United States import statistics. The difference amounted to approximately 3 million pounds in 1951 and 1952 and to about 1 million pounds in 1953 and 1954.

TABLE 29.--COMPARISON OF MEXICAN EXPORT RECORDS ON FRESH AND FROZEN SHRIMP TO THE UNITED STATES, AND UNITED STATES IMPORT RECORDS ON FRESH AND FROZEN SHRIMP FROM MEXICO

(In thousands of pounds, headless basis. Figures based on official published documents of both countries.)

Year	United States imports from Mexico	Mexico exports to United States	Difference
1951	39,575	36,722	2,853
1952	33,762	30,886	2,876
1953	36,768	35,501	1,267
1954	34,886	33,940	946

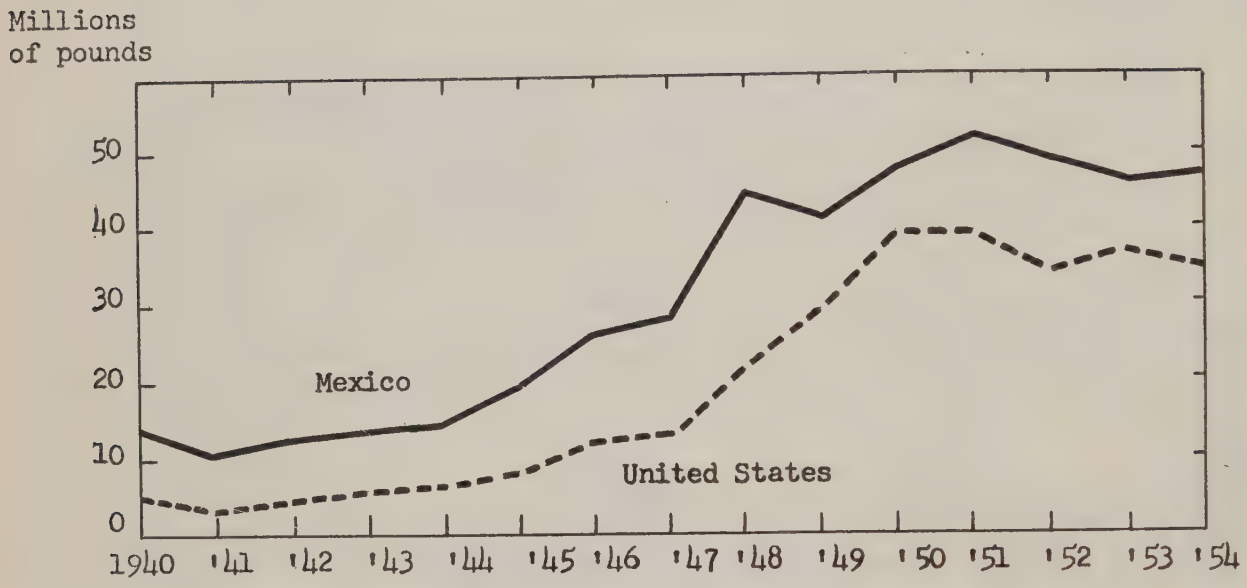
For the above-stated reasons it is preferable to use the United States import figures for studying the trend in Mexican shrimp exports.

TABLE 30.--UNITED STATES IMPORTS OF FRESH AND FROZEN SHRIMP FROM MEXICO

(Headless basis)

Year	Thousand pounds	Year	Thousand pounds
1940	4,913	1948	21,477
1941	3,116	1949	29,382
1942	4,419	1950	39,653
1943	5,747	1951	39,575
1944	6,082	1952	33,762
1945	7,874	1953	36,768
1946	12,056	1954	34,886
1947	13,228		

Figure 17.--MEXICAN SHRIMP PRODUCTION AND UNITED STATES IMPORTS OF MEXICAN SHRIMP



For the 5-year period 1950-54, United States imports of frozen shrimp have averaged over 76 percent of Mexico's total shrimp catch. In 1954 over 86 percent of Mexico's production of fresh and frozen shrimp was exported (almost all to the United States). The dried and canned shrimp are mostly sold within Mexico; in 1954 less than 1 percent of the dried shrimp were exported.

Export duties

Mexico levies export duties on a variety of products. Canned shrimp are exempt from export duties but fresh, frozen, and dried shrimp are dutiable. Export duties per 100 net kilograms (220 pounds) on shrimp products in effect in July 1955 were, for fresh and dried shrimp, 30 centavos plus 10 percent ad valorem plus 25 percent ad valorem plus 2 percent municipal, and for frozen shrimp, 30 centavos plus 5 percent ad valorem plus 2 percent municipal. The municipal tax is applied to the total export taxes; in other words, it amounts to 2 percent of the export tax.

The official valuations upon which the duties are assessed are as follows:

Fresh shrimp: (a) From the Gulf of Mexico, 8,888 pesos ($711) per 1,000 net kilograms; (b) from the Pacific, 9,873 pesos ($790) per 1,000 net kilograms.

Dried shrimp: 590 pesos ($47) per 100 net kilograms.

Frozen shrimp: (a) From the Gulf of Mexico--Salina Cruz, Oaxaca, or Santa Rosalia, Baja California--9,110 pesos ($729) per 1,000 net kilograms; (b) from elsewhere in Mexico, 10,129 pesos ($810) per 1,000 net kilograms.

As can be seen, lower export duties are imposed on fresh and frozen shrimp from the Gulf of Mexico and frozen shrimp from Salina Cruz and Santa Rosalia than on the remainder of the products coming from the Pacific coast of Mexico.

In a fashion, this amounts to a subsidy designed to assist the Gulf of Mexico producers to compete with the United States producers and to encourage the industrial development of the ports of Salina Cruz and Santa Rosalia.

The export tax per metric ton (2,204.6 pounds) in each instance amounts to the following:

Fresh or iced shrimp: (a) From the Gulf of Mexico, 3 pesos plus 888 pesos plus 2,222 pesos, or 3,113 pesos plus 2 percent of this latter amount or 62 pesos, making a total of 3,175 pesos (about $254); (b) from the Pacific, 3,527 pesos (about $282).

Dried shrimp: 2,109 pesos (about $169).

Frozen shrimp: (a) From the Gulf of Mexico, Salina Cruz and Santa Rosalia, 467 pesos (about $37); (b) from the remainder of Mexico, 520 pesos (about $42).

These amounts have been converted into cents per pound in table 31.

Other than export duties, there are no restrictions on shrimp exports. Export duties as well as export licensing provisions can be changed by executive action.

TABLE 31.--MEXICAN EXPORT TAX IN CENTS PER POUND

Origin of product	Fresh shrimp	Dried shrimp	Frozen shrimp
Gulf of Mexico	11.525	7.654	1.697
Pacific coast other than Salina Cruz and Santa Rosalia	12.801	7.654	1.886
Salina Cruz, Santa Rosalia and Baja California	12.801	7.654	1.697

Export costs

Export costs, including severance taxes of 22 centavos per kilo of frozen headless shrimp at Carmen averaged about 9 cents a pound in 1953, 7 cents in 1954 and 6.5 cents during the first quarter of 1955. The costs of export from Guaymas are probably slightly under those for Carmen, and those from Mazatlan and Salina Cruz are probably somewhat higher.

Transportation and export taxes comprise the bulk of the exportation costs. From Carmen, ocean freight (generally to Brownsville, Texas) averaged between 3 and 3.5 cents a pound. Export taxes in 1955 were about 2 cents a pound. From Guaymas to Los Angeles, California, or San Diego, California, transportation by refrigerated truck in 1955 costs 2.5 cents a pound, net weight of shrimp. Export taxes were about 2 cents per pound.

Custom charges and services, both Mexican and United States, ran about .4 cent a pound at Carmen in 1955. Mexican transfer and loading charges amounted to about .2 cent, 42/ and insurance about .3 cent a pound. Miscellaneous charges such as association dues, telephone and telegraph, etc., averaged between .3 and .5 cent a pound. Ocean freight charges include on-the-dock delivery at Brownsville, Texas.

42/ Three separate unions handle the loading of frozen shrimp at Carmen. One carries the product to the land side of the dock, another the length of the dock to the ship rail, and the third from the rail to stowage in the hold.

The trend in export costs of products originating in Carmen has been downward since 1953. Practically all of this drop in costs can be traced directly to a decrease in total export taxes. Some of this decrease results from devaluation, and some represents an actual peso decrease in tax.

Imports

Mexico's imports of fishery products consist principally of canned sardines and dried codfish. Most of the sardines come from Portugal and the codfish from Norway. Shrimp imports are not shown separately in Mexican official statistics, but they are insignificant.

Mexico (summer 1955) has no import quotas or embargoes on shrimp, but quotas or embargoes can be effected almost immediately by executive action.

Import duties and requirements

The Mexican import duty on fresh or iced shrimp was 15 centavos per gross kilogram plus a 15 percent ad valorem on the official evaluation of 6.50 pesos per gross kilogram. This amounts to slightly over 4 cents per gross pound.

The import duty on dry shrimp, salted shrimp, or canned shrimp is 2 pesos per legal kilogram 43/ plus a 45 percent ad valorem on the official evaluation of 12.70 pesos per legal kilogram. This is equivalent to a duty of 62 cents per legal kilogram or about 28 cents per pound.

43/ The item "Fish and shellfish, all species, fresh or refrigerated" is reported in gross kilograms. All other items are in legal kilograms. Mexico uses three types of weights: 1. Net weight, which is the weight of the product without container; 2. Legal weight, which is the weight of the product including the immediate container, e.g.: the entire weight of a can of sardines, including the can; 3. Gross weight, which is the entire weight of the product including the immediate and accessory containers, e.g.: the entire weight of a case of sardines including the case.

In addition, canned, dry, or salted shrimp, like all processed or packaged foodstuffs, must be registered with the Ministry of Health and Public Welfare before importation permits are granted. To register a product it is necessary to submit to the Direccion General de Registro y Control de Alimentos y Bebidas one copy of each English label, together with a proposed label in Spanish for each product. This Spanish label, which may be typewritten, must show the name of the product, the name and address of the manufacturer, the name and address of the Mexican representative or distributor, the phrase "Reg. S.S.A. No. _____ A", the phrase "Producto Norteamericano", the net weight in grams or kilograms, and a list of contents. Also required is a certificate stating that the product is freely offered for sale in the United States. This certificate should be issued by a Chamber of Commerce and legalized by a Mexican consulate. The registration charge is 50 pesos ($4.00).

On completion of these requirements a provisional registry number is issued. After issuance of the provisional registry number the manufacturer has a period of 2 months in which to submit a photograph of the label of each product. The photograph must show the approved Spanish label, complete with the registry number. The customary practice is to have the Mexican representative register the products. If this procedure is followed, the manufacturer must issue a letter authorizing the representative to act for him.

There are no preferentials extended to other countries for the importation of shrimp that are not also extended to the United States.

GOVERNMENT ASSISTANCE

The Cooperative Development Bank (Banco Nacional de Fomento Cooperativo), a government bank for aiding cooperatives, has been taking a progressively more important part for the past several years in the Mexican shrimp industry. The bank is financing the building of nine trawlers 44/ in Mazatlan--apparently the only shrimp-boat building going on along the west coast (winter 1955-56).

The cooperative bank in Guaymas handles the production of at least 5 cooperatives (mostly bay shrimp) which own about 6 trawlers. The bank also buys shrimp from independent boat owners. From September 1 to

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44/ These include seven steel 55-foot trawlers and two wooden 65-footers. The 55-footers are said to cost 390,000 pesos ($31,200) ready to fish, including net, galley equipment, etc.

December 31, 1954, the bank exported about 138,000 pounds of frozen shrimp. During the same period in 1955 the bank exported about 664,000 pounds. This represents an increase of about 481 percent, whereas the total exports from Guaymas increased only about 208 percent.

It is estimated that the Banco Nacional de Fomento Cooperativo collects about $250,000 a year in taxes from the shrimp industry. Half of the severance tax 45/ collected on shrimp goes to the Banco Nacional de Fomento Cooperativo and the remaining half to the National Treasury. Of this second half the Treasury is supposed to turn over half (25 percent of the total) to the state and municipal governments. In addition to this the bank also collects 15 centavos a kilogram (about .5 cent a pound) on all shrimp frozen on the west coast of Mexico. This charge is not levied on shrimp frozen along the east coast of Mexico. 46/

The funds collected from the fishing industry and turned over to the cooperative bank are for the purpose of obtaining fishing gear and equipment and processing plants for the cooperative fishermen. 47/

45/ The severance tax is as follows:

Type of product	Pesos per kilogram	Equivalent in cents per pound
Shrimp, fresh headless	0.22	0.80
Shrimp, fresh, whole	0.21	0.76
Shrimp, cooked, headless	0.25	0.91
Shrimp, dry, without shell	0.22	0.80
Shrimp, dry, with shell	0.21	0.76

46/ The east and west coasts of Mexico, with respect to regulations applying to the shrimp industry, are quite distinct. Taxation (severance and export), cooperative contracts, and fishing regulations are different.

47/ The cooperative bank handles practically the entire catch of west-coast lobsters exported to the United States.

Two fishery schools are operated by the Mexican Government, one at Mazatlan (formerly at Guaymas), and another at Alvarado, Veracruz. A third school is planned for either Ciudad del Carmen or Campeche. The schools are for boys who have completed the primary (6th grade). The course is 1 year and, in addition to history, mathematics, and grammar, some training is given in navigation, boat and engine repair, fishing techniques, and net making and repair. The students are furnished room and board.

Occasional assistance for biological work aimed toward conservation and management of the shrimp resources has been given through the Ministry of Marine and the Bank of Mexico. The sums have not been large and by no means in proportion to the importance of the industry or to the revenue the government derives from it. Much of the biological work has been financed directly by the industry.

Although only applicable indirectly to the fishermen and no longer in effect on shrimp, the law pertaining to new industries was of considerable assistance in establishing the shrimp-freezing industry in Mexico. Under this law the freezing plants were exempt from import duties and surcharges, stamp taxes, gross receipt tax, and the normal income tax on industrial profits. These benefits, for shrimp freezing plants, expired in 1951.

NICARAGUA [48/]

The Caribbean coast of Nicaragua now produces about 100,000 pounds annually, heads-on basis. This coast may possibly produce at some time in the future 2 to 3 million pounds or more a year. The shrimp perhaps scatter for long periods of time, a factor which has a bearing on the probability of commercial activities. Feeding grounds for adult white shrimp, it is presumed, are not plentiful. An exclusive contract has been let for fishing in a 100-mile section of the Caribbean coast.

The prospect for a shrimp fishery on the Pacific coast of Nicaragua is unfavorable because of the scarcity of nursery grounds. At best this area might produce 200,000 pounds annually.

COMMERCIAL SPECIES AND FISHING GROUNDS

At present, there are no shrimp fisheries along the Pacific coast of Nicaragua. The white or blue shrimp, Penaeus stylirostris and P. occidentalis, are known to occur in the Gulf of Fonseca but apparently are not fished by the Nicaraguans.

Along the Caribbean coast about 100,000 pounds, heads-on weight, of shrimp are taken each year. The principal fishing areas are the lagoons near Bluefields and the Pearl Lagoon, where men fish with cast nets from dugouts. The young of the white shrimp, probably Penaeus schmitti, and perhaps Penaeus setiferus, are caught in the lagoons. Reports from Puerto Cabezas indicate that occasionally large white shrimp appear in sizeable schools virtually on the beach. When this occurs, the inhabitants catch them with sacks, screens, and buckets. Such incidents happen infrequently.

Various trawling operators have reported pink shrimp, Penaeus duorarum, all along the Caribbean coast. These shrimp appear to be dispersed and not concentrated in aggregations.

48/ The survey of Nicaragua was made during February, 1956, and this date is implied when current events or prices are alluded to.

Cabo Gracias a Dios
CARIBBEAN SEA
Puerto Cabezas
3-9
Gulf of Fonseca
3-9
Pearl Lagoon
9
4-8
Corinto
Managua
3-9
Bluefields
9
PACIFIC OCEAN
NICARAGUA SHRIMP SPECIES AND LOCATIONS
3 Penaeus duorarum
4 P. stylirostris
8 P. occidentalis
9 P. schmitti
60 miles

NICARAGUA

OUTLOOK FOR PRODUCTION

The only known nursery ground on the Pacific coast of Nicaragua is in the Gulf of Fonseca. There probably is another, but not very important, near Corinto. The west coast is not likely to produce any quantity of shrimp; production at best could reach a maximum of 200,000 pounds, heads-on.

The Caribbean coast might be able to produce 2 to 3 million pounds, heads-on, of shrimp a year. There are certain conditions which may prevent the development of a fishery. From reports of all known trawling operations, either the white shrimp bunch up only occasionally or the schools are few and far between. The pink shrimp seem to be widely dispersed, though it may develop that they concentrate at certain times in certain areas. This section of the coast has had a fair, but not a sufficient, amount of exploration.

PROCESSING AND MARKETING

Most of the shrimp caught in the lagoons on the Caribbean coast are consumed fresh or dried. Some are frozen in home-type freezers in Bluefields for local sale and for sale in Managua. Young white shrimp, called "chacalin", run between 25 and 150 to the pound, headless. The fishermen receive about 14 cents a pound (values in U.S. currency) heads-on, and about 21 cents headless.

The government has granted an exclusive trawling contract for a section of the Caribbean coast. The boundaries of the section, 100 miles long, are to be decided upon by mutual agreement between the contractor and the government. The contract was published 49/ in 1953, and the duration, provided certain conditions are met, is for 10 years from date of publication. The contract calls for payment to the government of $25 for each ton (2,000 pounds) of shrimp exported.

FOREIGN TRADE

There are no export duties on shrimp. In 1954 about 1 metric ton, (2204.6 pounds) gross weight, of dried shrimp was recorded as exported, some to the United States and some to Costa Rica.

Imports of shrimp, though not shown separately in the Nicaraguan reports, are unimportant. In 1954, less than $500 worth of fresh, frozen, dried, or salted crustaceans and mollusks and only $7,000 worth of canned crustaceans and mollusks were imported.

49/ La Gaceta, May 28, 1953

Import duties on shrimp comprise a specific duty levied per gross kilogram and payable in United States dollars, plus an ad valorem duty based on the c.i.f. value; they are as follows:

	Specific duty (cents)	Ad valorem duty (percent)
Fresh or frozen	30	20
Dried	32	20
Canned.	73	20
Soups and chowders.	32	20

There is also a 5 percent consular fee based on the f.o.b. value.

PANAMA

Only the Pacific coast of Panama produces shrimp. Most of the catch is taken in the Gulf of Panama and landed at four freezing plants in the town of Panama. Only Panamanian-built boats can fish in waters over the Continental Shelf. The Panamanian export of white-shrimp tails may possibly increase to about 5 to 8 million pounds annually; the United States imported about 3 million pounds of these shrimp in 1954. The quantity of pinks and sea bobs that may be produced in the future is unknown. The pack of white shrimp runs about 80 to 85 percent under 15 to the pound, headless. About 85 percent of the catch is exported to the United States. Shrimp are Panama's second most important export item.

COMMERCIAL SPECIES AND FISHING GROUNDS

There are three species of large shrimp, Penaeus occidentalis, P. stylirostris, and P. vannamei, known as white shrimp in Panama. All are called "langostinos," and the fishermen and dealers make no distinction between the three. P. occidentalis is generally of a rustier color than the other two species, but at times it cannot be distinguished from P. stylirostris by color alone.

The smaller species of shrimp are called "camarones." These consist of "rojos" or pinks (P. brevirostris), "titi" (Xiphopeneus riveti and Protrachypene precipua), and "indio," "carabeli," "tigre," or "zebra" (Trachypeneus byrdi and T. faoe).

The langostinos are large shrimp. The pack runs about 33 percent under 10 to the pound headless, 50 percent 11/15, 10 percent 16/20, 5 percent 21/35 count, and 2 percent peeled and pieces.

The largest pinks run 21/25 to the pound headless, but the bulk of the catch is between 26/30 and 41/50 count.

The indio is smaller than the pink, and the titi is still smaller. Usually both the indio and titi are peeled and deveined. In this state the indio is generally under 60 to the pound, and the titi 60 and over.

Most of the white shrimp are taken between 3 and 10 fathoms, rarely beyond 15 fathoms. The pink are caught out to about 30 fathoms and the titi in shallow water close to shore.

The Panamanian Government has not maintained records of the amount of shrimp taken each year. The catches can best be approximated

PANAMA SHRIMP SPECIES AND LOCATIONS

4	Penaeus stylirostris	12	Xiphopeneus riveti
5	P. vannamei	13	Protrachypene precipua
7	P. brevirostris	14	Trachypeneus byrdi
8	P. occidentalis	15	T. faoe

PANAMA

from the United States imports, since exports have all been to the United States. About 600,000 pounds of headless shrimp are consumed annually in Panama.

It is estimated that Panama produced about 4.3 million pounds, headless weight, of shrimp in 1954.

Probably 80 percent or more of the total Panama shrimp catch is white shrimp. Of this amount, Penaeus occidentalis accounts for 85 to 90 percent, and the remainder is about equally divided between P. stylirostris and P. vannamei.

The pink and titi and indio combined are represented in about equal amounts in the remaining 20 percent of the catch. About 500,000 pounds of pink shrimp (headless weight) were caught in 1955. In 1954 about 200,000 pounds of peeled and deveined titi and about 20,000 pounds of indio were produced. The 1955 production of these last two species was about twice that of 1954.

Trawling for individual species of shrimp is definitely seasonal. The best months for whites, titi, and indio are from April through November. The pink shrimp season is between January and April.

It is probable that the upwelling of cold water in the Gulf of Panama during the dry season (December to March or April) has an important bearing on the shrimp seasons.

Shrimp fishing with cast nets and seines is an ancient art in Panama. The use of otter trawls to catch shrimp, on the other hand, is quite recent, starting in 1946, when one trawler began fishing for shrimp. The catches of this boat soon flooded the Panamanian market, and the owner was forced to seek an export outlet which was found in the United States. Interest rapidly developed in shrimp fishing and boats began pouring into Panama. As a result there are now about 90 trawlers in Panama.

All of these boats fish on the Pacific side; there are no developed fisheries along the Caribbean shore. Shrimp occur there, but they are reported to be scattered, the trawling grounds few and rocky, and the weather generally bad.

There are two fishing areas on the Pacific side of Panama. One is in the Gulf of Panama, and the other is in the west and extends from about Punta Mariato to the Costa Rican border. The Gulf of Panama is considerably more productive than are the western grounds. The catch from both grounds is landed in the town of Panama.

OUTLOOK FOR PRODUCTION

As far as white shrimp are concerned, there are no fishing areas of any apparent significance that are not being fished. The present areas can be, and undoubtedly will be, fished more intensely. Through increased fishing effort the catch of white shrimp can perhaps be doubled. This means that the annual catch of white shrimp may reach between 5 and 8 million pounds, headless.

The pink shrimp occur in deeper and colder waters than do the whites. They are taken in abundance in the Gulf of Panama only during the period of upwellings, usually between December and April, when they apparently move into the shallower, cooler waters. On occasions during this period, pink shrimp are extremely abundant, yielding catches of as much as 8 tons (heads-on) in 3 or 4 days. During heavy runs of pink shrimp the boats are placed on limits, since the plants are unable to handle the catch.

Exploratory fishing in deeper water might show that pink shrimp could be fished profitably throughout the year, but too little is known about the distribution, habits, and abundance of this species to hazard a guess as to its productive potential.

The titi and indio likewise are too little known to allow an estimate as to what their yield might ultimately be. Undoubtedly, the production of all three of these smaller types can be increased appreciably, provided a profitable market is available.

FISHERMEN AND GEAR

There are about 500 full-time shrimp fishermen in Panama. The usual crew consists of five men or of four men and an apprentice--a captain, an engineer, and three hands, or two hands and a striker. The fishermen do not belong to unions or come under social security, nor do they own any of the boats.

They are paid on a trip-share basis. The trip expenses (ice, fuel, and food) are deducted from the gross returns, and the remaining amount is divided 60 percent to the boat owner and 40 percent to the crew, or 65 percent to the boat owner and 35 percent to the crew. In either instance, the captain gets 12 percent and the engineer 9 percent. Owners who pay 40 percent to the crew give the three hands about 6 percent each; those paying 35 percent give 7 percent each to two hands, and the striker, usually a boy, gets the fish that are caught or is paid something from the sale of the fish.

The captains are estimated to average about $160 50/ a month, the engineers about $120 and the hands between $90 and $95.

There are about 90 shrimp trawlers operating in Panama. Most are wooden Florida-type trawlers with diesel engines. A few are converted west-coast fishing boats from the United States. They are from about 35 to 65 feet long, the average length being about 50 feet. About 15 new trawlers were under construction in November, 1955. The majority of these were to have wooden hulls, but about four were to be of steel. Since August of 1953 only boats built in Panama can fish commercially in Panamanian waters.

Most boats are owned by the dealers or processors. Probably about 15 boats are owned by persons who sell to the processors. The average boat with its gear and equipment is worth about $18,000. Total investment in vessels and gear is estimated to be about $1.6 million.

Fishing trips in the Gulf of Panama are usually from 5 to 7 days; trips to the western grounds may last 10 to 12 days. In 1954, the average boat caught about 50,000 pounds of white shrimp, headless weight. The price paid the boat owners was about 36 cents a pound. In November, 1955, prices were high, and boat owners were receiving between 50 and 55 cents a pound for headless white shrimp.

The general accounting practice seems to be to depreciate the boat and engine in 10 years. The engines are overhauled every 10 to 18 months. The boats are hauled, cleaned, and copper-painted about every 4 months. Full-coverage insurance, $500 deductible, costs 6 percent of the evaluation of the boat. Ice costs between $8 and $9 per ton, and a boat will use around 250 tons of ice a year. Fuel and oil costs run slightly higher than the ice.

The prevalent type of trawl is the Gulf of Mexico design flat trawl from 40 to 95 feet at the mouth. The average is around 75 feet with 2½-inch mesh (stretched), 18-thread in the wings and body and 42-thread in the tail. The nets are without spacers. The wings are fastened directly to the boards. A boat will use, on the average, 1 net every 2 months. While the net lasts, it is repaired constantly. Towing cables are replaced about once a year.

50/ Exchange rate, 1 balboa = United States $1.00; values are given in United States dollars only.

PROCESSING AND MARKETING

Neither dry nor canned shrimp are produced in Panama. The only processing is by freezing. There were four shrimp freezing plants in Panama in November, 1955. The total daily capacity was about 45,000 pounds, but an additional 3,000 pounds was expected to begin operating early in 1956. About $250,000 is invested in plant equipment.

There appeared to be a trend toward producing more peeled and deveined shrimp. One source estimated that only about 5 percent of the 1954 export pack was peeled and deveined, whereas for the first 10 months of 1955 about 15 percent was this type of pack.

The plant designs, in general, are not very efficient. There is at present sufficient freezing capacity to handle (on a 24-hour basis) any anticipated increase in catch that might be forthcoming in the near future. Bottlenecks that occur are not caused by lack of freezing capacity. They usually originate in the grading and packing departments and could be eliminated through use of mechanical graders and improved plant-flow design.

There is no government control or inspection for standardization of grades or quality control. The government maintains a sanitary control over the packing plants and the employees, which consists of inspection of the plants about every 6 months and the keeping of health cards for the workers.

The bulk of the Panamanian white shrimp catch is frozen headless in 5-pound cartons for export to the United States. Second-quality white shrimp, usually black spotted, are peeled and frozen. Some of the pinks, and much of the titi and indio, are peeled and deveined by hand and frozen for export.

The general practice is to layer-pack the headless shrimp in 5-pound cartons, freeze them, open the frozen cartons and add glazing water, close the cartons, pack them inverted into master cartons, close and strap the master carton, and place it in the storage room awaiting shipment. This technique, which is also the common practice in Ecuador and on the east coast of Mexico, gives only a surface glaze.

Some of the peeled white shrimp are layer-packed, but most are jumbled. Other than peeling, which is done by hand, the handling practices are the same as those for headless frozen.

The titi and indio, which are landed whole, are usually handled in two operations. First they are headed; then they are peeled and deveined. The peeling is done individually with a patented plastic peeler. The deveining is done with a paring knife.

The peeled and deveined meats are washed and weighed (5 pounds) into a plastic bag which is then placed into a 5-pound carton. The shrimp are then frozen and packed into master cartons. This product is not glazed, as the plastic bag prevents dehydration. Sometimes these shrimp are separated into two sizes, under 60 to the pound and over 60.

Cost of the 5-pound cartons varies, from about 5½ cents for 1-piece cartons to about 6 cents for 2-piece. The price is to some extent determined by the volume used. The general practice is to calculate that all packing materials--cartons, master cartons, and strapping--cost about 2½ cents per pound of shrimp.

In the local markets, shrimp are sold fresh, both whole and headless. In November, 1955, the retail prices for jumbo white shrimp were 50 cents a pound for fresh whole and 60 cents for fresh headless.

At this same time brokers were paying 70 cents a pound for under-10 count frozen headless shrimp f.o.b. Cristobal. The price for frozen peeled and deveined titi, running more than 60 to the pound, was 45 cents per pound.

There are about 40 men and 30 women employed full-time in the shrimp-freezing plants, and about 500 part-time workers, most of whom are women.

For full-time work the men get from 40 to 60 cents an hour and the women 25 cents an hour. The work week is 48 hours.

Some of the part-time workers are paid by the hour, but the majority are paid on a piecework basis. The piecework pay varies from plant to plant, but it is generally about 3 cents for packing 5-pound cartons and from .6 to .7 cent a pound for peeling titi.

For full-time workers the rate of overtime pay, which is governed by law, depends upon the time of day when the overtime occurs. The day is divided into a daytime period (5 to 7) and a night period (7 to 5).

The maximum number of working hours without overtime is 8 daily and 48 weekly for daytime work and 7 and 42 for night work. If overtime is worked during the day period, the worker is paid 25 percent extra; during the night period it is 50 percent extra. For work on Sundays or national holidays, the pay is a flat 50 percent extra.

The plant workers do not belong to unions. In some of the plants the full-time workers receive some fringe benefits which may

include annual vacations and the use of dormitory facilities for the women who work after dark, but in general the fringe benefits are few. Most full-time workers are covered by social-security, for which the worker pays 4 percent and the employer 4 percent.

The social security benefits include both payment in kind and payment in money. Payment in kind is generally in the form of free hospital and medical care, but it does not completely cover these costs. Monetary compensation includes maternity benefits and old-age and disability pensions. There are no unemployment provisions in the Panamanian social security law.

The employer is responsible for indemnity in case of accidental death or temporary disability of an employee. Insurance against these professional risks costs 6 percent of the gross salary.

Full-time workers are entitled to a 1-month vacation for every 11 months worked. They are also entitled to an advance notice of termination which varies from 24 hours after 1 week of work up to 2 months after 2 years or more. The vacation and termination-notice features of the law are generally calculated to cost the employer about 17 percent of the gross salary of an employee.

FOREIGN TRADE

Exports 51/

Panama is not a great exporting country. Total exports in 1953 amounted to about $15.5 million of which over $14 million, or more than 90 percent, went to the United States. Foodstuffs valued at about

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51/ The figures cited in this section are from official Panamanian sources. The export figures in poundages may be greater than actual, and the values smaller. They are based on export licenses, for which no charges are made. The practice of the shippers is to obtain, a day or two in advance, a license to export "X" amount of shrimp. It is customary, when the exact amount to be exported is not known, to apply for a permit allowing exportation of a greater amount than anticipated. A copy of this document goes to the Bureau of Statistics and Census. The actual amount exported, which appears on the customs agent's copy, may not be sent to the Bureau of Statistics and Census for rectification of the original request.

The declared value is usually lower than the true value, since it represents an estimate by the shipper who generally, for business reasons, underestimates the value of the product. One source estimates that the value should be twenty to forty percent higher than shown.

$14.6 million accounted for most of the 1953 exports; manufactured products were worth only $726,000. In this same year, shrimp were Panama's second most valuable export amounting to about $2 million.

TABLE 32.--EXPORTS FROM PANAMA BY PRODUCTS, 1953
(In dollars)

Product	Value
Bananas	8,159,000
Shrimp	1,916,000
Cacao	1,319,000
Abaca fiber	1,029,000

Panama's shrimp exports represent frozen shrimp, most of which are headless. Small quantities are exported as peeled, and peeled and deveined shrimp.

Shrimp exports have increased greatly since 1950, when only about 300,000 pounds with a value of about $170,000 were exported (table 33). In 1954 Panama exported about 4 million pounds of frozen shrimp valued at more than $2 million.

Over 85 percent of the Panamanian shrimp production is exported to the United States.

TABLE 33.--SHRIMP EXPORTS FROM PANAMA, 1950 - 1954
(In thousands of pounds and thousands of dollars. All shrimp exports are to the United States.)

Year	Quantity	Value
1950	304	168
1951	1,261	705
1952	2,415	1,352
1953	4,584	1,916
1954	4,069	2,044

Source: Direccion de Estadistica y Censo.

There are no export duties on shrimp in Panama. The only requirement for export is a permit which is solely for statistical purposes. The shrimp companies work under a 25-year contract with the government, one clause of which exempts them from all export duties.

Imports

Panama imports more than it exports. Most of the imports are manufactured goods and foodstuffs. In 1953 Panama imported about $71.6 million worth of goods of which almost $48.7 million were manufactured products and $11.7 million were foodstuffs. About 65 percent of the total imports ($46.2 million) were from the United States.

Most of the dried and all of the canned shrimp consumed in Panama are imported. Panama does not import fresh or frozen shrimp. Since 1950 the annual amounts of dried shrimp imported have fluctuated from about 17 to 40 metric tons with a value ranging between $45,000 and $65,000. Imports of canned shrimp have ranged from 2.5 to 5.5 metric tons annually with values between $4,000 and $10,000. Most of the dried and canned shrimp come from the United States.

TABLE 34--SHRIMP IMPORTS INTO PANAMA BY PRODUCT AND BY COUNTRY OF ORIGIN

Year and country of origin	Dried or salted		Canned	
	Pounds	Dollars	Pounds	Dollars
1950:				
United States	87,500	$62,700	8,600	$7,000
Hong Kong	(1)	(1)	700	300
Others	-	-	(1)	100
Total	87,500	62,700	9,300	7,400
1951:				
United States	84,200	60,900	7,500	5,800
Hong Kong	-	-	400	100
Others	-	-	-	-
Total	84,200	60,900	7,900	5,900
1952:				
United States	76,700	64,000	8,800	6,400
Hong Kong	400	200	200	300
Others	200	100	2,400	1,800
Total	77,300	64,300	11,400	8,500
1953:				
United States	34,600	42,700	5,100	3,900
Hong Kong	1,500	600	200	100
Others	2,000	1,300	(1)	(1)
Total	38,100	44,600	5,300	4,000
1954:				
United States	52,000	44,000	11,300	9,400
Hong Kong	3,800	2,200	200	100
Others	900	700	400	300
Total	56,700	46,900	11,900	9,800

1/ Less than 100 pounds or $100.

Source; Direccion de Estadistica y Censo.

There are no import regulations or restrictions on shrimp other than import duties. The duties on dried or salted shrimp are 3 cents per gross kilogram (2.2 pounds). There are no duties on canned, cured, or pickled shrimp.

GOVERNMENT ASSISTANCE

The Panamanian shrimp fishery has been developed by private initiative, but has been aided considerably by government policy. The fishery started with United States capital, but in 1953 a group of influential Panamanians bought out most of the companies then operating. This organization probably controls 60 to 70 percent of the capital that is invested in the Panamanian shrimp fisheries.

In order to encourage industry the Panamanian Government, in 1950, enacted Decree-Law No.12. Some of the provisions of this law are as follows:

1. Industries established, or to be established, in Panama may obtain a contract with the Government for a period of up to 25 years.

2. Companies with these contracts are exempt from all import duties on machinery, equipment, apparatus, replacement and spare parts, fuel, oil, supplies and other commodities for use or consumption by the company.

3. Companies are exempt from import duties on any raw material.

4. Foreign technicians are exempt from Panamanian security laws.

5. Companies are exempt from all taxes, contributions, duties and levies on installations, operation, production, distribution, sales and consumption except income, social security, stamp, notarial and registration fees for public services. The rate of these fees in effect at the time of signing the contract will continue for the duration of the contract.

6. Companies are exempt from all export duties.

7. In case the necessity for it is established a protective tariff will be enacted.

The companies receiving such contracts must--

1. Invest a stated amount in the business.

2. Produce for national consumption.

3. Sell locally at wholesale prices.

4. Employ nationals with the exception of necessary foreign technicians.

All shrimp companies operating in Panama have come under the purview of this Act and have obtained 25-year contracts with the government.

A more recent decree (No. 172 of August 5, 1953) provides that only boats built in Panama can fish commercially. This legislation has prevented a sudden influx of shrimp trawlers which otherwise might have occurred. It has also given stimulus to local boat builders (there were about 15 trawlers under construction in November, 1955).

Decree No. 172 also permits commercial fishing in waters over the Continental Shelf only to those persons having a second-class commercial license. Panamanian and United States citizens can obtain these licenses without residence requirements. Nationals of all other countries must have resided 5 years in Panama prior to issuance of a license.

For the past several years the Food and Agriculture Organization, in cooperation with the Panamanian Government, has been studying methods of improving the management of the shrimp fisheries. This program, however, has not gone into developmental work.

PERU 52/

The Peruvian shrimp fishery is at the northern tip of Peru. It is limited to a narrow strip about 30 miles long. This area probably will not produce more than 600,000 to 900,000 pounds, heads-off, annually. The fishery started in 1952, reached a peak of about 500,000 pounds, headless weight, in 1954, but dropped off sharply after the middle of 1955. There are no docking facilities. Supplies must be run through the surf in skiffs or on balsa rafts. Fresh water is scarce.

DEVELOPMENT OF THE SHRIMP FISHERY IN PERU

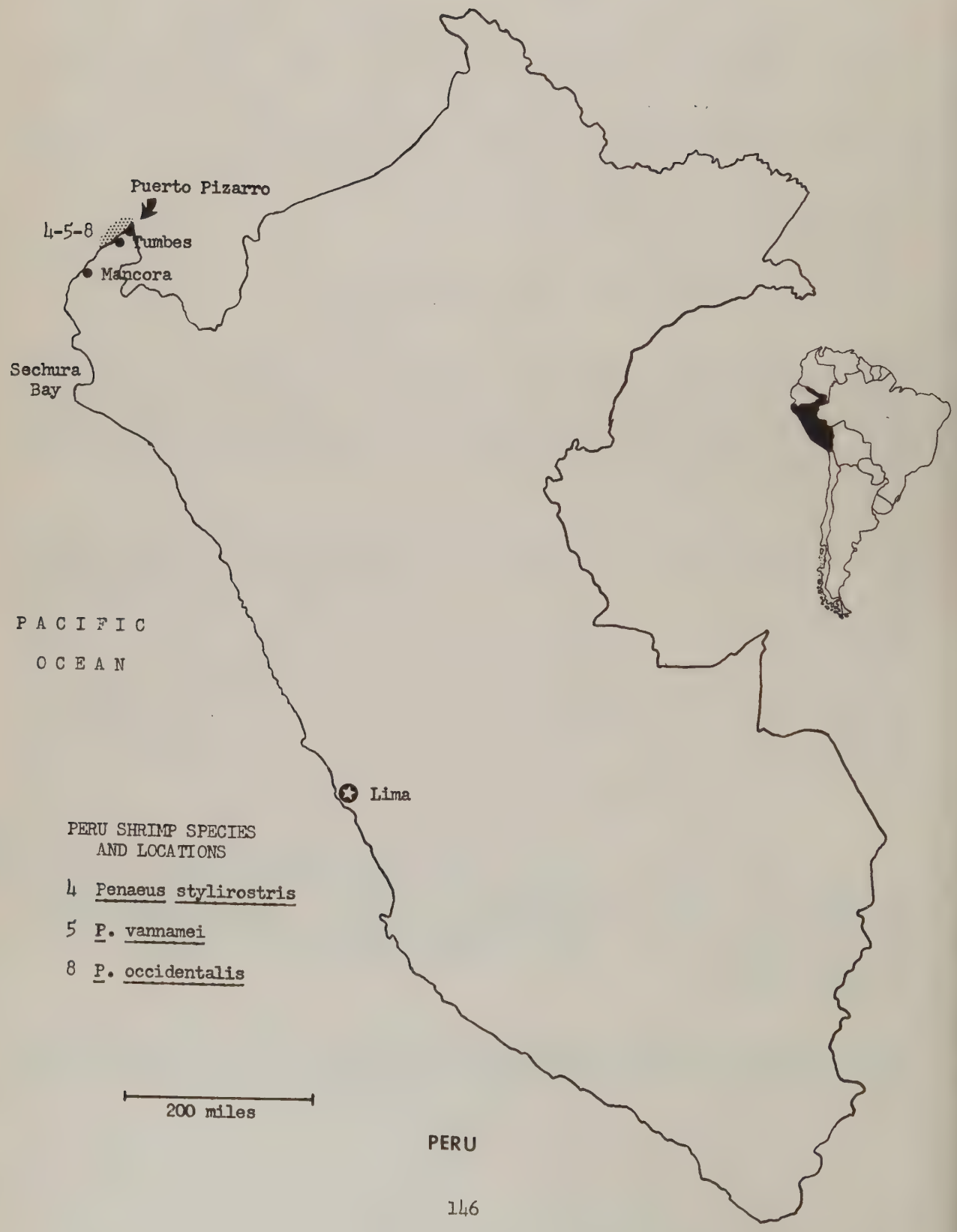
The Peruvian shrimp fishery started in the latter part of 1952 when a Belgian trawler began operations. The development of the fishery was stimulated by high prices in the United States and by a local scarcity of swordfish and skipjack caused by a change in ocean currents. A number of swordfish boats were diverted to trawling for shrimp with 20-to 24-foot beam trawls. Later most of these boats changed to small otter trawls 35 to 40 feet across the mouth.

At the height of the fishery in 1954 and early 1955 there were about 40 boats fishing for shrimp, and four companies were buying shrimp along with other fishery products. Shrimp were a side product, and fishing for these crustaceans took place principally to give the crews employment during lulls in the fishing for other species. At that time three floating plants and one shore plant were freezing shrimp. By June, 1955, the shrimp catches were so small that the boats were not meeting expenses, and most companies stopped shrimping operations by September, 1955. In October only two boats, one a German-built trawler handling a 40-foot shrimp trawl and the other a Danish boat using a 24-foot beam trawl, were fishing for shrimp.

COMMERCIAL SPECIES AND FISHING GROUNDS

Three species of peneid shrimp, "langostinos," are taken commercially, Penaeus stylirostris, P. vannamei, and P. occidentalis. Neither the fishermen nor the processors distinguish between them. All are called "blanco" or white shrimp. The sea bob, Xiphopeneus riveti, and the "tiger" shrimp, Trachypeneus byrdi and T. faoe, are also caught but are discarded because of their small size.

52/ The survey of Peru was made during October, 1955, and this date, unless otherwise specified, is implied when current events or prices are alluded to.


Puerto Pizarro
4-5-8
Tumbes
Mancora
Sechura
Bay
PACIFIC
OCEAN
Lima
PERU SHRIMP SPECIES
AND LOCATIONS
4 Penaeus stylirostris
5 P. vannamei
8 P. occidentalis
200 miles
PERU

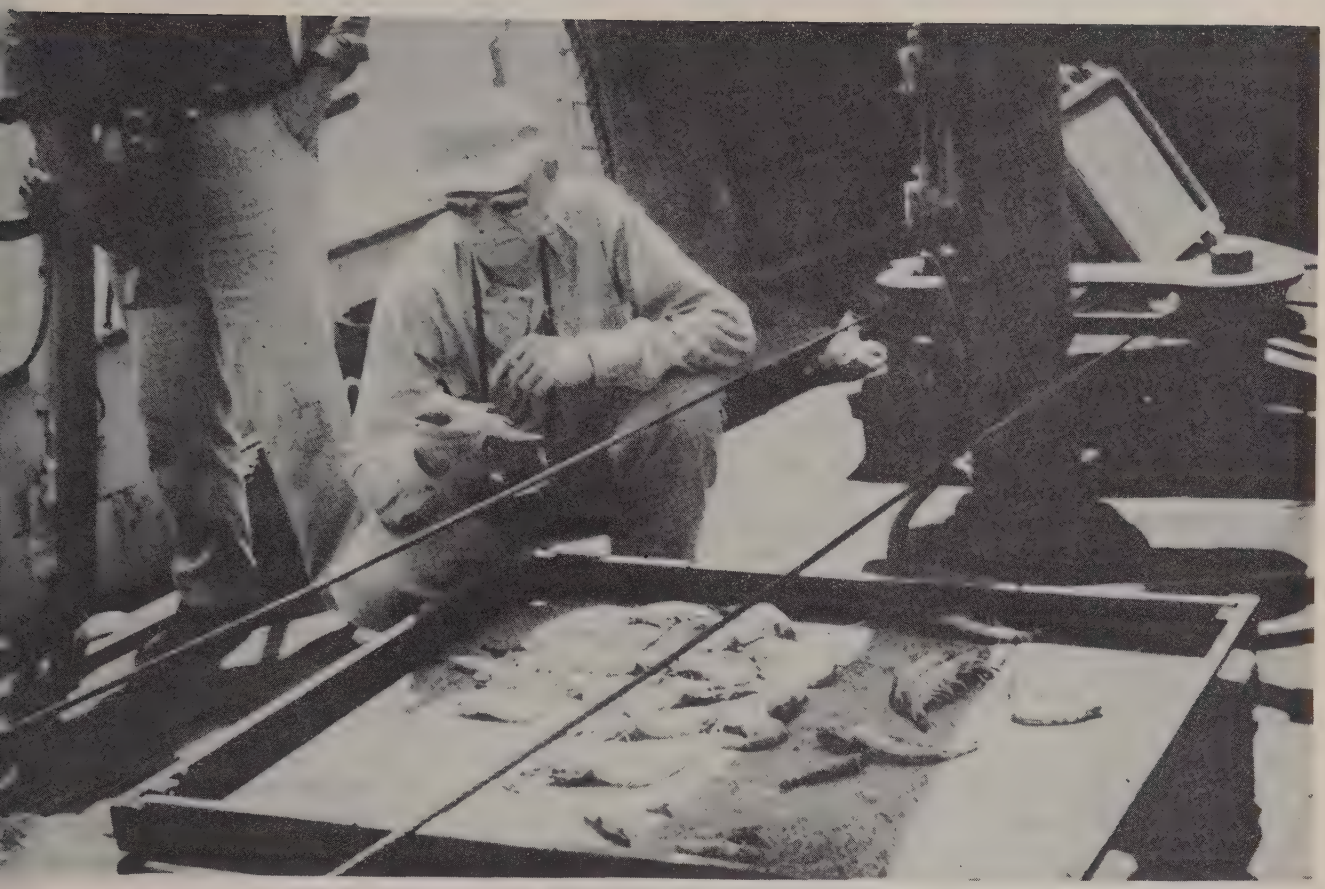


Figure 18.--Jumbo shrimp, mostly Penaeus occidentalis, from north coast of Peru.

The three commercial species are probably about equally distributed in the catches. The shrimp are large; about 85 percent of the pack is under 15 to the pound, and 65 percent is under 10 to the pound, headless. Sizes smaller than 16/20 are not packed.

The shrimp-fishing grounds are very limited in area. From the Ecuadoran border they extend only about 30 miles down the coast to Caleta Cruz. Scattered shrimp have been reported as far south as Sechura Bay, but not in commercial quantities. Shrimp are caught in depths to 15 fathoms but appear to be most abundant near the beach in 3 to 6 fathoms.

Peruvian catch records are based upon estimates made by the port captains and are not particularly accurate. These records show that 38,000

pounds of shrimp were taken in 1952, 206,000 pounds in 1953, and 409,000 pounds in 1954. 53/ It is believed that the 1954 catch was about 500,000 pounds, headless weight, with a value of about 3,500,000 soles ($182,300). 54/

Shrimp are caught throughout the year, but the best season was reported to be between October and March. The government has not established closed seasons.

OUTLOOK FOR PRODUCTION

Because the range for shrimp is limited both by lack of suitable nursery grounds for the young and by lack of feeding grounds for the adults, Peru has little possibility of producing much more shrimp than the estimated 500,000 pounds, headless weight, that were caught in 1954. The only nursery ground of any magnitude is that near Puerto Pizzaro. To the south there seem to be no nursery grounds, and the abrupt coast and the cold waters of the Humboldt current limit the area in which the adults may live.

It seems likely that many of the shrimp caught in Peru were migrants from Ecuador. If shrimp population pressure off Ecuador was responsible for such migrations, it can be anticipated that as the Ecuadoran fishery increases, there will be fewer migrants moving into the waters of northern Peru.

The potential of the fishery is estimated to be between 600,000 and 900,000 pounds annually.

FISHERMEN AND GEAR

In October, 1955, there were only about 10 men fishing for shrimp. When the fishery was at its peak (1954 and early 1955) over 150 men were employed in catching shrimp. Usually the crews consisted of four men, one of whom was always ashore. The boats were operated around the clock with three men; they returned to port every 2 days to unload the catch, take on more ice, put one man ashore and take aboard the crew member who had been ashore 2 days. By rotating in this manner each man worked 6 days and nights and then had 2 days off.

The boats, gear, and all operating expenses were provided by the companies. Each crew member was allowed 5 soles (about 26 cents) a day for rations. In addition, the crew were permitted to keep all marketable fish for themselves, which was usually sufficient to cover additional food costs. The crews were paid 3 soles (about 16 cents) for

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53/ United States imports from Peru in 1954 were about 447,000 pounds.
54/ Free exchange in October, 1955, was U. S. $1.00 = 19.20 soles.

each kilogram (2.2 pounds) of headless shrimp. The "patron" or boat captain, depending upon the efficiency of the individual, received either one-third or 40 percent of the proceeds from the catch. The remainder was divided equally among the rest of the crew. The boat captains averaged annually between $900 and $1,100, and other crew members between $500 and $650.

Some privately owned boats were paid as much as 5 soles (about 26 cents) for each kilogram of headless shrimp and each crew member was allowed 8 soles (about 42 cents) a day for food. In these instances the boats were better outfitted, and the captains were foreigners and not local fishermen. The better captains were paid as much as 3 soles (about 16 cents), the engineer 80 centavos 55/(about 4 cents), and the hands 40 to 60 centavos (2 to 3 cents), depending upon their number. With an average catch of 2 to 3 tons a month, the annual wages of the crew were: captain, $3,750 to $5,600; engineer, $1,000 to $1,500; hands, $500 to $1,125.

The fishermen do not belong to labor organizations.

There were only two boats fishing for shrimp in October, 1955. One, a 65-foot boat, was powered by a 120-horsepower Diesel engine and handled a 24-foot beam trawl. The other, a 54-foot, 2-mast, steel-hulled German trawler, had a 75-horsepower Diesel engine and used a 40-foot Gulf of Mexico flat trawl. The trawl was rigged with gallows and fished from the starboard side, using a 2-drum winch and steel towing cables. The trawl was of 2-inch stretched mesh, 18-thread in the wings and 42-thread in the tail, made from Peruvian webbing. The net, without boards, cost about $100.

This boat carried a 5-man crew who normally finished 6 days, continuously day and night, each trip. The daylight hauls averaged 2 hours and the night hauls 4 hours each.

The smaller boats, which were in operation when the fishery was at its peak, were converted swordfish boats of 40 to 45 feet in length with 25- to 50-horsepower gasoline engines. In the beginning these boats used 20- to 22-foot beam trawls, but later changed to 35-foot flat shrimp trawls. Rope towlines were used which were hauled on niggerheads.

The total investment, including gear in storage, was estimated to be about $100,000.

Insurance, total-loss, cost 3½ percent for diesel-engined boats and 5 percent for gas-engined. Diesel fuel was 50 soles (about $2.61) for a 55-gallon drum. Ice was $10 per ton. A fishing permit is required, but no charge is involved for local or foreign boats fishing for Peruvian companies. Fishermen are not required to be licensed.

55/ There are 100 centavos to a sole.

Production costs for a privately owned trawler were estimated to be about 28 cents a pound for an annual catch of 55,000 pounds, headless weight. Crew wages were estimated to be 12 cents a pound, and operation and maintenance costs, including insurance and depreciation, were estimated at 16 cents.

PROCESSING AND MARKETING

The freezing of shrimp is but a minor part of the general freezing operations, which normally are for skipjack, yellowfin tuna, and swordfish. During 1954 and part of 1955, one shore and three floating plants were operating part-time in freezing shrimp. All were based at, or near, Mancora.

The shrimp are headed at sea immediately after capture and are iced down in large insulated boxes. At Mancora the boxes are loaded onto skiffs or balsa rafts, transported through the surf to the beach, placed on trucks, and carried to the plant. Upon arrival at the plant the shrimp are placed in a metal tank and given two washings with sea water and a final rinse in fresh water. They are then layer-packed in 5-pound cartons and given a top glaze after freezing.

Since Mancora has no pier, the frozen shrimp destined for export must be lightered through the surf to the cargo boats.

All cartons are Peruvian-made. Because of selling price, operating costs, freight, and export duties, the plant operators claimed they could not profitably pack and freeze shrimp for export that were smaller than 16/20 to the pound, headless.

The plant workers handle shrimp along with other fishery products. The plant workers are all male, and at the peak of production about 35 were employed part-time on shrimp. The workers received 2 soles (about 10 cents) an hour for a 44-hour week, but with overtime they averaged between $5 and $6 weekly. Time and a half is paid for overtime, and double time on Sundays and holidays. The workers are not unionized.

The government has made no specific effort to assist the development of the shrimp fisheries.

FOREIGN TRADE

Exports and export taxes

Peruvian records do not show separately shrimp exports before 1953. In that year about 332,000 pounds (gross weight) of frozen shrimp were exported, according to the records of the government. In 1954 the amount rose to 507,000 pounds. All shrimp exports went to the United States.

There are no restrictions on the exportation of shrimp, but export taxes apply. There are five, and on occasions six, separate export taxes. The sixth is applied when the export value exceeds the basic legal-cost-of-production value by more than 25 percent. The basic legal-cost-of-production value of frozen shrimp was set on September 4, 1953, at 9,300 soles (about $484) per ton of 2,000 pounds. An export tax of 10 percent is applied on the difference between this "cost of production" figure and the sales price of the shrimp. In addition to this tax there are also a 1-percent ad valorem tax on all exports, a tax of 2 soles per metric ton on exports, a 2-percent tax on declared freight rates, and an export cargo tax that is $1.60 per metric ton for products exported from Callao and 15 cents per ton from all other ports. These taxes, in all, are estimated to amount to about $90 per metric ton of shrimp.

Early in 1955 a law was enacted which permitted companies exporting fishery products to enjoy privileges formerly granted only to exporters of agricultural and mineral products. This law allows the companies to deduct the export taxes from the profit and excess-profit taxes.

Imports and import duties

Shrimp imports (table 35) are mostly dried shrimp from Hong Kong, the United States, and Japan. This product is primarily for the Chinese population. In 1954, less than 100 metric tons of dried shrimp with a reported value of about $90,000 were imported. The fresh and frozen crustaceans reported in table 35 are principally fresh lobsters imported from Ecuador. All canned and dried shrimp consumed in Peru are imported. Probably most, if not all, fresh and frozen shrimp consumed within the country are produced in Peru.

Shrimp are subject to three types of import duties: a specific duty on gross weight; an ad valorem duty of 2 percent with a 20-percent surcharge; and a 2-percent fee on marine freight charges. The specific duties on shrimp for each gross kilogram (2.2 pounds) of weight are: for fresh or frozen, 2 soles (about 10 cents); dried, 1.50 soles (about 8 cents); dried small Chinese shrimp, 1 sole (about 5 cents); canned or prepared in any other form, 1.20 soles (about 6 cents).

TABLE 35.--IMPORTS OF SHRIMP INTO PERU BY COUNTRY OF ORIGIN IN 1,000 KILOS AND 1,000 SOLES

(Weights are all in gross kilos)

Product and source	1950		1951		1952		1953		1954	
	Kilos	Soles	Kilos	Soles	Kilos	Soles	Kilos	Soles	Kilos	Soles
Dried shrimp:										
Hong Kong	.4	5.6	3.0	17.7	-	-	-	-	-	-
U. S. A.	-	-	8.4	186.1	18.7	416.0	.1	4.6	9.7	267.8
Japan	-	-	-	.2	1.0	19.7	3.0	47.5	-	-
Total	.4	5.6	11.4	204.0	19.7	435.7	3.1	52.1	9.7	267.8
Small dried Chinese shrimp:										
China	3.4	71.4	1.7	23.4	.3	3.7	3.6	52.7	7.1	65.3
Great Britain	.1	1.6	-	-	-	-	.3	6.4	-	-
Hong Kong	17.3	250.0	28.0	265.7	24.6	244.0	40.6	362.9	49.8	528.5
U. S. A.	-	-	8.0	235.8	10.9	282.2	2.0	80.6	16.1	605.7
Japan	-	-	3.9	62.4	3.0	53.4	9.6	198.1	10.0	220.3
Others	-	-	.1	.9	-	.1	2.3	26.8	1.5	24.7
Total	20.8	323.0	41.7	588.2	38.8	583.4	58.4	727.5	84.5	1,444.5
Shrimp, crabs, and lobsters, prepared in any form:										
U. S. A.	-	.4	13.2	274.9	7.8	183.0	4.2	125.6	14.1	357.7
Hong Kong	5.0	58.1	2.6	25.8	3.2	27.4	2.4	19.8	2.9	27.7
Japan	-	-	6.3	134.5	12.7	236.6	5.3	90.2	6.4	159.0
Others	2.7	50.6	5.4	119.9	3.3	83.8	.7	25.2	.7	7.5
Total	7.7	109.1	27.5	555.1	27.0	530.8	12.6	260.8	24.1	551.9
Shrimp, lobsters, or crawfish, fresh or frozen:										
Ecuador	-	-	9.8	60.6	18.4	65.9	11.2	40.7	8.8	34.4
U. S. A.	-	-	.9	19.3	2.1	21.4	1.0	4.6	.6	5.5
Others	-	-	.5	12.6	-	-	.2	.8	.2	.9
Total	-	-	11.2	92.5	20.5	87.3	12.4	46.1	9.6	40.8

Source: Estadistica del Comercio Exterior, Ministerio de Hacienda y Comercio, Superintendencia General de Aduanas, Departamento de Estadistica.

SURINAM [56/]

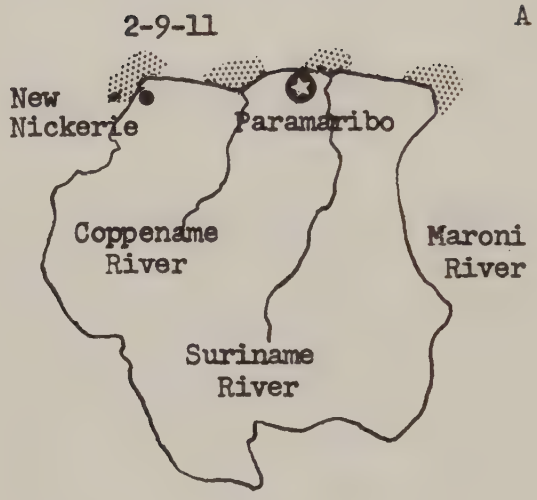
The Surinam shrimp catch is almost entirely sea bobs, the cooked peeled meats of which average more than a hundred to the pound. One company has an exclusive right for 15 years to export the catch in excess of 88,200 pounds annually. The present catch of about 1 million pounds, heads-on weight, can probably be increased to 5 or 6 million pounds.

COMMERCIAL SPECIES AND FISHING GROUNDS

The sea bob, Xiphopeneus kroyeri, is by far the predominant species on the nursery grounds in Surinam. The white and brown shrimp, Penaeus schmitti and P. aztecus, occur in the area but comprise less than 1 percent of the catch. Experimental fishing along the entire coast during April-September, 1953, with an otter trawl was reported to have yielded only about 2 percent Penaeus. The white and brown shrimp are reported to be more abundant near the French Guiana border and less abundant towards the west. All shrimp are called "sara-sara."

The shrimp are caught by trap nets and pin seines in the rivers, near the mouths, and along the beaches near the river mouths. About 600 fishermen work full-time catching both shrimp and fish by these means. The trap net, "fuiken" or Chinese shrimp net, is used principally for shrimp, and the pin seine, a long wall of webbing anchored to a series of stationary poles, for fish; but the two gears catch both shrimp and fish. The trap net is operated on the outgoing and incoming tides, while the pin seine is used only on falling tides.

56/ The survey of Surinam was made during April 1956, and this date is implied when current events or prices are alluded to.



SURINAM SHRIMP SPECIES AND LOCATIONS

2 Penaeus aztecus

9 P. schmitti

11 Xiphopeneus kroyeri

150 miles

SURINAM

Figure 19.--Chinese shrimp nets near the mouth of the Suriname River in Surinam. The men are about finished fishing on this tide. Most of the nets have been raised. One is in the process of being raised and one is still being fished.

Figure 20.--Craft at dock of fishing village near the mouth of the Suriname River with the catch of one tide from Chinese trap nets. The catch of the second boat from the left was mostly shrimp, the sea bob, Xiphopeneus kroyeri.

Figure 21.--Drying shrimp at a fishing village near the mouth of the Suriname River in Surinam.

The annual catch of shrimp is estimated to be about 1 million pounds, heads-on weight. Almost all of this is boiled, sundried, and peeled. A few are sold fresh, whole. Experimental batches of frozen cooked peeled shrimp have been produced. The cooked peeled meats average more than a hundred to a pound.

The shrimp for drying are boiled from 2 to 5 minutes in a brine made of 1 part imported mine salt and 10 parts water. Usually a simple kettle made from half of an oil drum is used for boiling. Five or six batches, with occasional additions of salt, are cooked before the brine is replaced. The cooked whole shrimp are spread upon bamboo mats which are placed in the sun on frames about 3 feet from the ground. Drying requires 3 to 5 days. When rain threatens, the mats are brought under shelter. The shrimp, when well dried, are threshed with a stick to remove the heads and shells. The fishermen,

depending upon demand, receive from 12 to 50 cents a pound for these peeled dried shrimp. The salt costs a trifle over 3 cents a pound. 57/

The average wage of an unskilled laborer in Surinam is between 75 and 90 cents a day.

OUTLOOK FOR PRODUCTION

When fully developed, the Surinam shrimp fishery probably will produce 5 to 6 million pounds, heads-on weight, of shrimp, mostly sea bobs, a year. To do this, trawling in nearby coastal waters will have to be employed.

The government is interested in fostering the development of the fishery industry, and it can be presumed, therefore, that shrimp production will increase in the immediate future. A plant for processing frozen cooked-peeled shrimp meats for export is nearing completion in Paramaribo in anticipation of an increased demand.

Some experimental trawling with rudimentary gear has been done, but the government is planning for additional experimental work with commercial-type equipment.

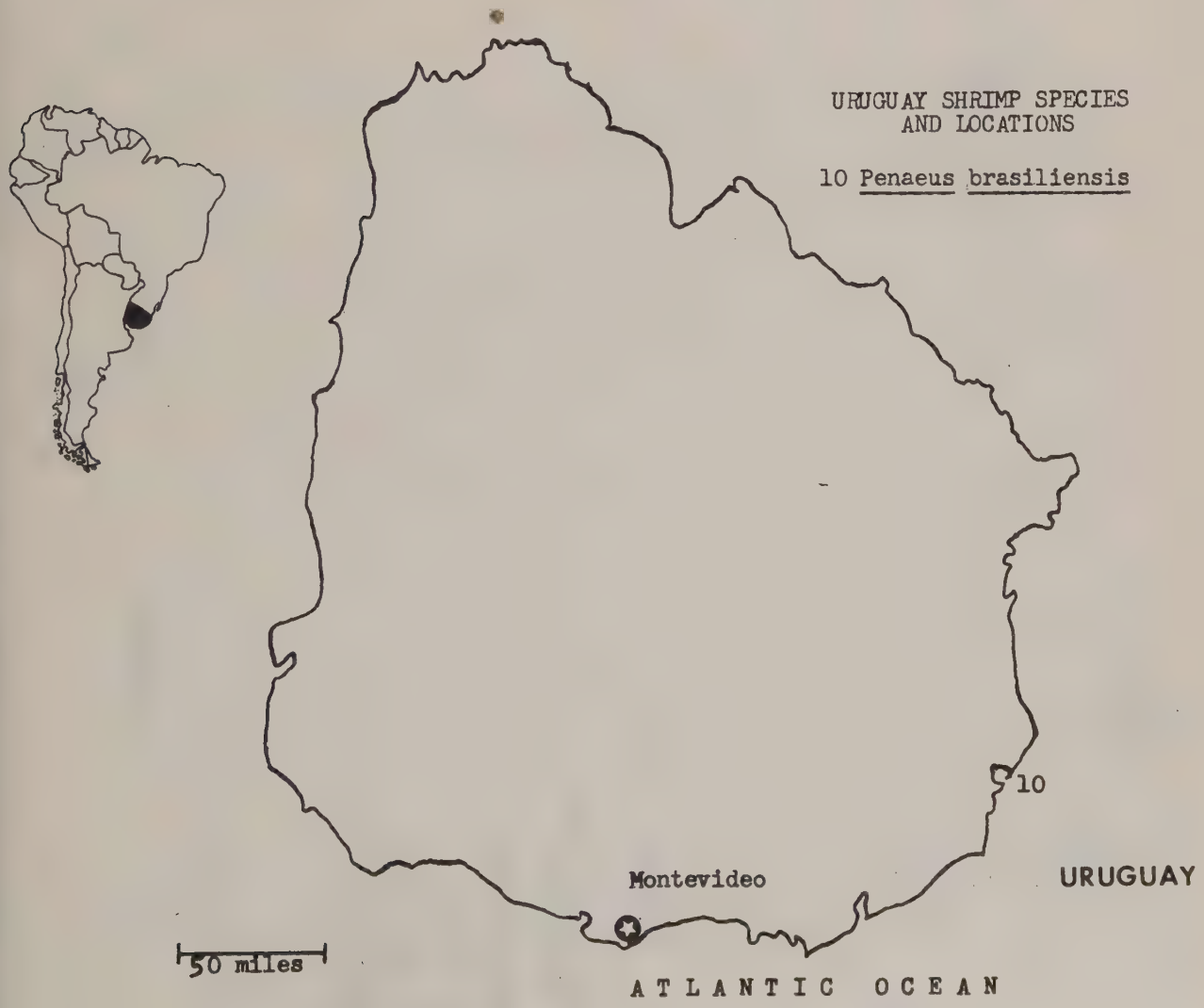
FOREIGN TRADE

Surinam imports and exports of shrimp are insignificant. In 1954, 4,400 pounds of dried shrimp were imported (from China) and 19,600 pounds of dried shrimp were exported. Most of the dried shrimp exports went to Trinidad. Imported shrimp are subject to a 20-percent ad valorem tax. Exports are free up to a total of 88,200 pounds annually; shrimp exports in excess of this amount are reserved for one company having an exclusive franchise for 15 years.

57/ Conversion rate 1 guilder = approximately U. S. 53 cents.

URUGUAY

Uruguay was not visited during this survey. Uruguay has no shrimp fishery, nor does it appear likely that she will develop one. Uruguay, or a part of it at least, seems to be in the transition zone between the area of the warm-water coastal Penaeus and the forms that inhabit the colder coastal waters. Along the northern coast Penaeus brasiliensis is occasionally taken in some of the lagoons. Normally these lagoons are not connected with the sea, but now and then a breakthrough will occur. When this happens, young P. brasiliensis may enter and develop in the lagoons.



Gulf of Venezuela
2
10
Punta Fijo
9
CARIBBEAN SEA
2
10
Maracaibo
P. Cabello
Caracas
Higuerote
9-11
Cumana
Pto. de la Cruz
El Hatillo
Gulf of Paria
Lake Maracaibo
9
Orinoco River
VENEZUELA SHRIMP SPECIES AND LOCATIONS
2 Penaeus aztecus
9 P. schmitti
10 P. brasiliensis
11 Xiphopeneus kroyeri
200 miles
VENEZUELA

VENEZUELA [58/]

Venezuela produces about 2 million pounds, heads-on weight, of shrimp a year. This production is consumed entirely within the country. Production may eventually reach 8 to 10 million pounds or more. The development of an export trade seems unlikely because of high costs. About 16 trawlers operate in western Venezuela catching both fish and shrimp for local markets. Trawling within 8 miles of the coast is prohibited. Sea bobs appear to be the most abundant shrimp near the mouth of the Orinoco River.

COMMERCIAL SPECIES AND FISHING GROUNDS

Four species of shrimp appear in the commercial catch of Venezuela. Penaeus schmitti, the young of which are taken in Lake Maracaibo and in the lagoons near El Hatillo and Puerto de la Cruz, and P. aztecus are the more common forms found in the markets. P. brasiliensis, which is caught along with P. aztecus by the trawlers operating out of Punta Fijo and Puerto Cabello, seems to be much less abundant than either of the other two species. Xiphopeneus kroyeri, the sea bob, apparently occurs from near El Hatillo to the British Guiana border but is fished only near El Hatillo. The sea bob, a species of small size, evidently is the most abundant form near the mouth of the Orinoco River.

For statistical purposes the Venezuelan Department of Fish and Game divides the coast into three zones;an eastern, a central, and a western zone. The eastern zone comprises the area between the frontier with British Guiana and Cape Unare near El Hatillo; the central zone extends to Cape Chichiriviche, a little west of Puerto Cabello; and the western zone extends to the Colombian border. Shrimp catches are usually largest in the western zone (table 36). Production of fresh shrimp has been increasing in recent years owing principally to the expansion of the trawl fleet. In 1955, according to official statistics, the catch was about a million pounds, heads-on weight. It is probable that the catch actually was nearer 2 million pounds.

58/ The survey of Venezuela was made during May 1956, and this date is implied when current events or prices are alluded to.

TABLE 36.--VENEZUELAN SHRIMP PRODUCTION

(In pounds. Fresh shrimp, heads-on basis. Dried shrimp are headed, peeled, and dried.)

Zone	1953		1954		1955	
	Fresh	Dried	Fresh	Dried	Fresh	Dried
Eastern	103,200	5,700	195,100	77,600	91,100	7,500
Central	102,100	-	21,200	-	403,200	3,800
Western	289,900	-	556,200	2,200	483,000	3,300
Total	495,200	5,700	772,500	79,800	977,300	14,600

OUTLOOK FOR PRODUCTION

Eventually Venezuela may produce 8 to 10 million or more pounds, heads-on weight, of shrimp a year. It is improbable that maximum productivity will be reached in the near future. Chances of exporting shrimp from Venezuela appear slim.

The present catch estimated at 2 million pounds annually comes mostly from Lake Maracaibo, the Gulf of Venezuela, and the area between Puerto Cabello and Chichiriviche. Small white shrimp are caught in Lake Maracaibo. On leaving the lake these shrimp appear to migrate to the southwest shores of the Gulf of Venezuela, but they apparently do not concentrate in the Gulf. The brown shrimp come from the eastern shores of the Gulf of Venezuela.

The catch in this area undoubtedly could be increased, but trawling is prohibited within 8 miles of the shore everywhere in Venezuela.

The lagoons between Higuerote and Puerto de la Cruz now produce small white shrimp. Trawling offshore should increase the catch appreciably in this area.

In the Gulf of Paria and around the delta of the Orinoco there is evidently a large population of sea bobs. No immediate prospects are in sight for developing a fishery for these small shrimp.

Owing to high costs in Venezuela and hard currency, it is not likely that an export market will develop. The catches of shrimp should increase as the local market develops and as additional processing equipment is installed in plants.

FISHERMEN AND GEAR

In Lake Maracaibo, near the town of Maracaibo, about 150 fishermen work part-time on shrimp. The men operate from dugouts, usually four to a dugout, using small beach seines and cast nets. When shrimp become scarce in this area, some of the fishermen move to Laos Island near the mouth of the lake. The shrimp taken by these fishermen are the young of the white shrimp.

A trawler was recently given a temporary permit to explore fishing possibilities in Lake Maracaibo and nearby waters. Reports of this operation indicate abundance, at times, of small (50 to 75 to the pound, headless) white shrimp near the mouth of the lake and of large and jumbo white along the southwest shore of the Gulf of Venezuela; they are not found in significant concentrations.

There are about 16 trawlers working out of Punta Fijo and Puerto Cabello. These boats are from about 45 to 125 feet long. Most are owned by an Italian company and are manned by Italians. Trawling is both for fish and for shrimp. The trips are of 3 or 4 days duration. During this time the boats fish the entire time, both day and night. Most of the shrimp are caught at night. The catch is iced down in small boxes holding about 22 pounds each of fish or shrimp. Shrimp caught by these boats are sold fresh, heads-on. They are carried in ice by trucks to Caracas and as far east as Puerto de la Cruz and Cumana.

Figure 22.--A Venezuela trawler used for catching shrimp and fish. Most of the Venezuela trawl fleet are Italian built. Notice the wide shoe on the trawl door hanging from the port gallows. This type of door is used on soft bottoms.

There are no shrimp-fishing operations near the mouth of the Orinoco River.

In the lagoons between Higuerote and Puerto de la Cruz small white shrimp and some sea bobs are caught with seines and cast nets. The best season is between December and March. Most of this catch is dried, although some of the larger shrimp are frozen in Puerto de la Cruz in 12-ounce and 2½-pound cartons, with overwrap and no glaze.

The freezer at Puerto de la Cruz is the only plant in Venezuela processing shrimp. A small shrimp cannery in Maracaibo was under construction at the time the survey was made.

PROCESSING AND MARKETING

The entire Venezuelan shrimp catch is sold locally, the majority as fresh-whole because of consumer preference. Some are frozen in Puerto de la Cruz, and some, usually the smaller shrimp from the eastern zone, are dried. All canned shrimp are imported, although construction of a small cannery in Maracaibo was under way. Almost all of the whole fresh shrimp come from the western zone. Trawlers out of Punto Fijo supply large and jumbo shrimp, and cast-net and seine fishing near Maracaibo furnish small shrimp.

The ex-vessel price, depending upon demand, for large and jumbo shrimp, heads-on, runs between about 27 and 55 cents a pound. 59/ When the ex-vessel price was 27 cents a pound, the wholesale and retail prices in Caracas were 41 and 68 cents. The retail price for heads-on shrimp would be comparable to about $1.14 a pound on a headless basis. The large and jumbo shrimp, P. aztecus mixed with a few P. brasiliensis, were trawl-caught.

Small whole white shrimp from Lake Maracaibo at about the same time were retailing, in Caracas, for about 48 cents a pound. The ex-dugout price in Maracaibo was about 14 cents a pound. Frozen headless medium-sized shrimp were about 51 cents for a 12-ounce carton. The frozen shrimp were from Puerto de la Cruz.

FOREIGN TRADE

Venezuela does not export shrimp.

In the import records shrimp are grouped with all other shellfish (table 37). The majority of shellfish imports, mostly canned shrimp, are from the United States. Some dried shrimp are imported from the United States, too, as well as small amounts of frozen shrimp from the United States and Mexico.

Venezuela, in order to encourage local fishing, has a high import duty, which amounts to approximately 27 cents a gross pound on fishery products.

59/ Conversion rate 1 bolivar = approximately U. S. 30 cents.

TABLE 37.--SHELLFISH IMPORTS INTO VENEZUELA BY COUNTRIES OF ORIGIN, 1953, 1954 and 1955

(In pounds and dollars)

Country of origin	1953		1954		1955	
	Quantity	Value	Quantity	Value	Quantity	Value
United States	221,800	149,200	203,100	129,800	226,000	125,200
Spain	54,400	35,200	60,800	18,500	84,000	24,800
France	29,300	21,500	25,600	21,000	27,800	21,000
All others	13,700	4,800	10,100	2,600	12,800	3,000
Total	319,200	210,700	299,600	171,900	350,600	174,000

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